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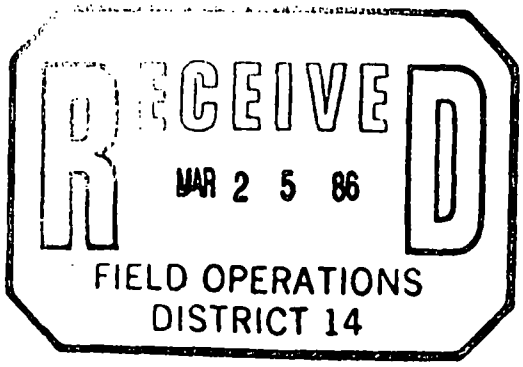
229-025-01

RECOMMENDED GROUNDWATER TREATMENT AND DISCHARGE PROGRAM FOR THE 100 CONGRESS AVENUE SITE, AUSTIN, TEXAS



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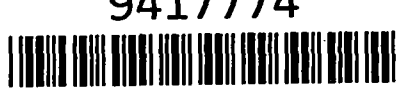

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1.0 INTRODUCTION

Radian Corporation has been retained by Lincoln Property Company (LPC) to provide several technical and engineering support services related to the occurrence of hydrocarbons in the subsurface at the 100 Congress Avenue site, Austin, Texas. At the request of LPC, Radian has analyzed samples of groundwater from the site and has performed laboratory and field treatibility tests on groundwater from the site. The objective of these efforts has been to develop recommendations for appropriate management of groundwater which is being pumped from the excavation at the site.

LPC has coordinated with several state and local agencies regarding the proper management of the groundwater and hydrocarbon material from the site. This report documents the results of chemical analyses and treatibility studies performed on groundwater at the site and presents Radian's recommendations for treatment and monitoring of groundwater from the site.

2.0 GROUND-WATER CONDITIONS AT THE 100 CONGRESS AVENUE SITE

Groundwater at the 100 Congress Avenue site occurs in a thin zone at the base of the alluvium of the Colorado River. The bedrock below the alluvium is Austin Chalk and Eagle Ford Shale. The relationships of the alluvium, bedrock, and groundwater are shown diagramatically in Figures 2-1 and 2-2. There relationships have been established based on reconnaissance field observations and examination of drilling logs rather than detailed mapping.

2.1 Ground-Water Quality

Samples of groundwater were collected from the site and analyzed for priority pollutants and general water quality parameters in July and November 1985, and in February 1986. Samples of the seepage water contaminated with coal tar residues were first obtained from the face of the excavation in July 1985. After its discovery, the contaminated water seeping into the construction site was collected in a 22,000 gallon "FRAC" tank. Subsequent samples collected from the "FRAC" tank in November 1985 and February 1986 were also analyzed for priority pollutants and water quality parameters. Table 2-1 (first three columns) provides a summary of the analytical results for the water samples collected over this period. Laboratory analytical data sheets for these analyses are included as Appendix B. The specific organic compounds found are typical at coal tars and include polynuclear aromatic hydrocarbon compounds. Table 2-1 (last two columns) also shows the water quality of effluent samples after bench and pilot scale treatment tests were performed using carbon filtration. The effluent sample analyses are discussed in subsequent sections of this report.

As can be seen from Table 2-1, the quality of the ground water has improved since it was discovered seeping into the pit in July 1985 to the point that in February 1986, the organic compounds typical of coal tar residues are no longer present at the limits of analytical detection. The

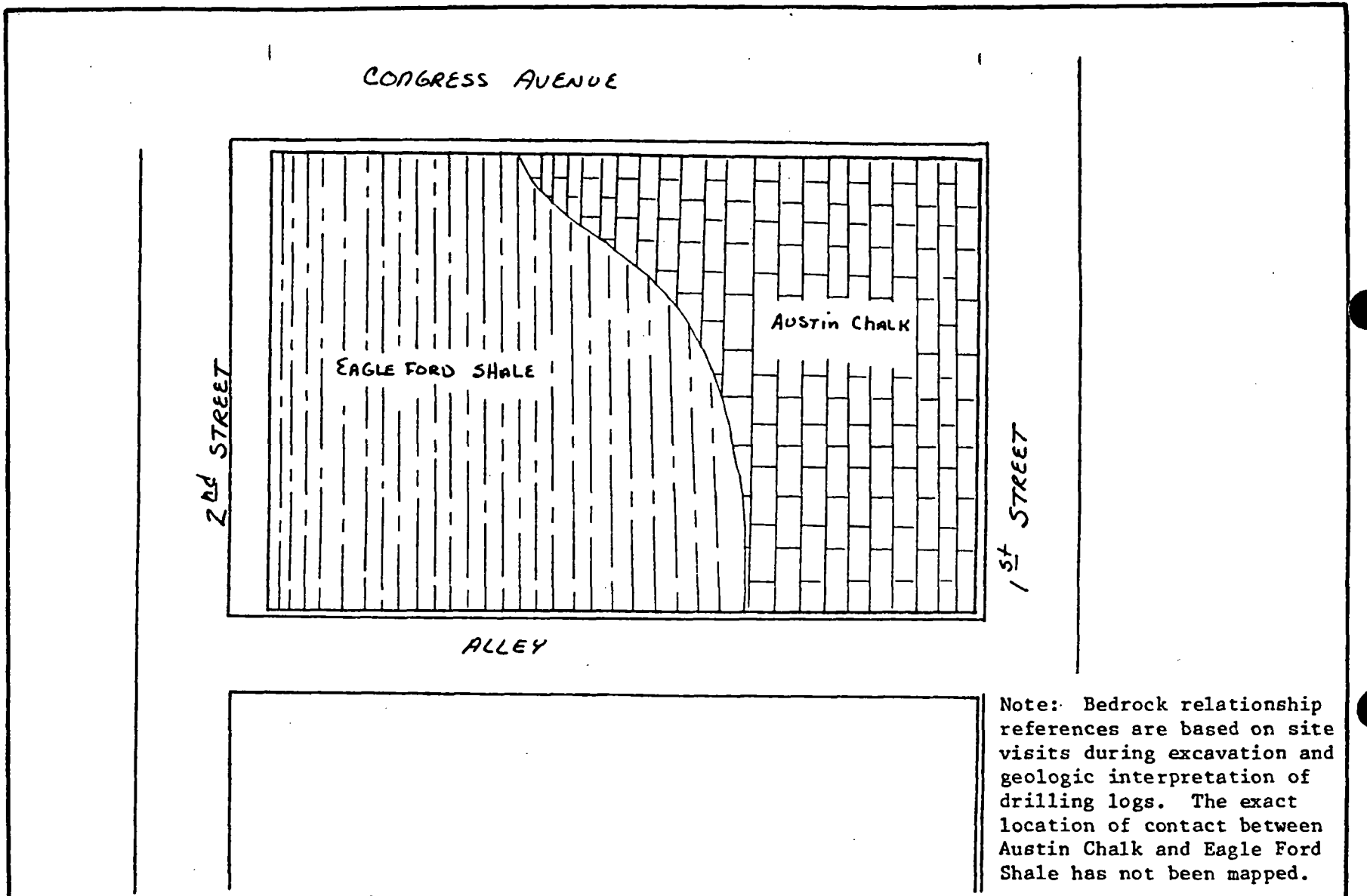

Figure 2-1. Inferred bedrock relationships at the 100 Congress Avenue Site -- Plan View.

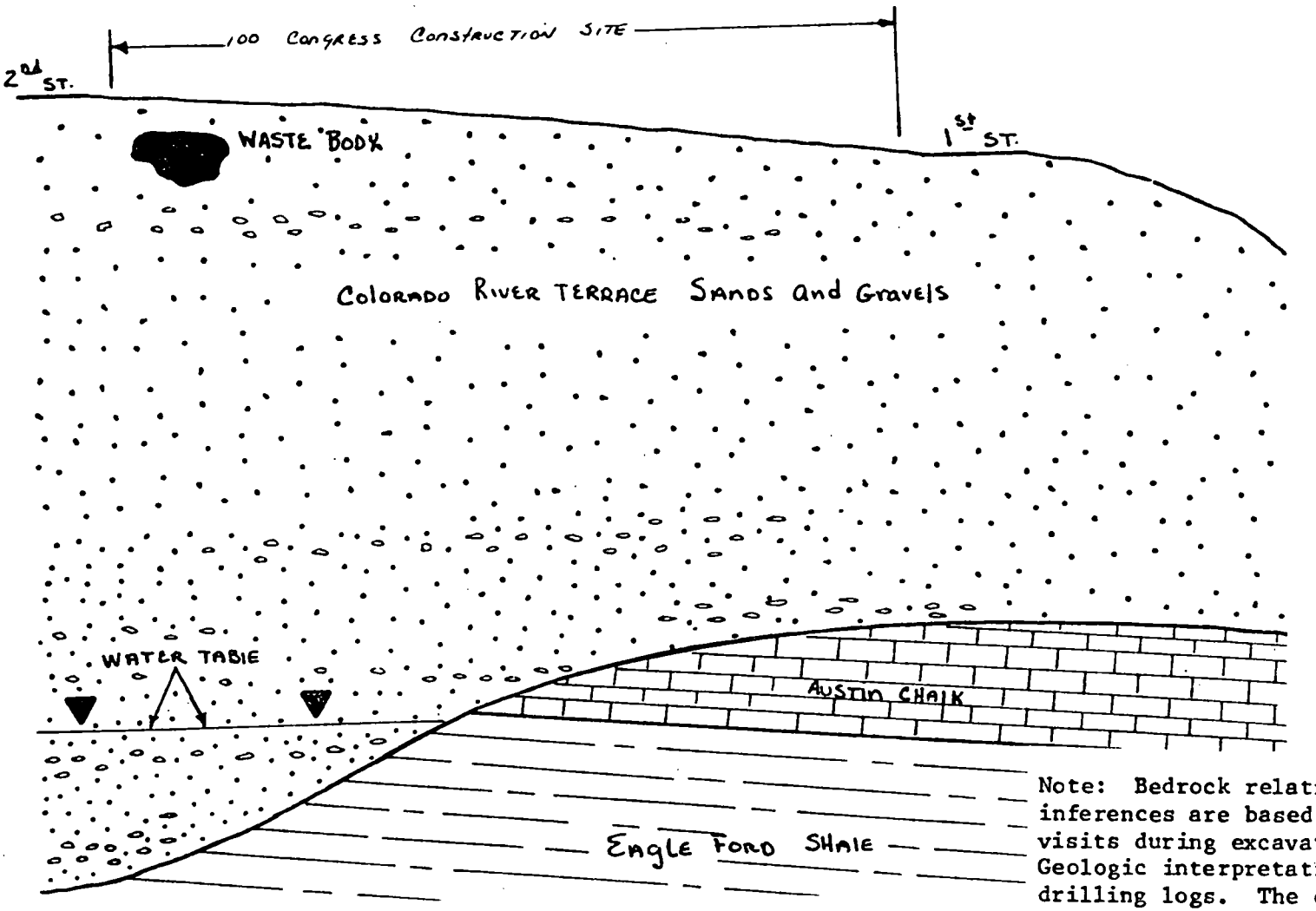

Figure 2-2. Inferred bedrock relationships at the 100 Congress Avenue Site -- Cross Section View.

TABLE 2-1. COMPARISON OF WATER QUALITY OF GROUND WATER AT 100 CONGRESS AVENUE (JULY 1985 TO FEBRUARY 1986) AND AFTER LABORATORY AND FIELD TREATABILITY TESTS

Parameters	From Pit 7/85 (mg/L)	From FRAC Tank 10/85 (mg/L)	From FRAC Tank 2/86 (mg/L)	From Carbon Bed Effluent[1] 10/85 (mg/L)	From Carbon Bed Effluent[2] 1/86 (mg/L)
Total Volatile Organic Compounds (EPA Method 624)	11.2	0.10	ND	ND	ND
Total Base/Neutral Organic Compounds (EPA Method 625)	56.2	0.05	ND	ND	ND
Total Acid Fraction Organic Compounds (EPA Method 625A)	ND	ND	ND	ND	ND
COD	-	110	21	7	15
BOD	-	4	12	1	7
pH	7.3	8.2	8.8	8.2	8.7

[1]Bench Scale Test
[2]Pilot Scale (Field) Test
[3]ND = Not Detected

substantial reduction in contaminant concentrations is apparently due to two factors: 1) the initial seepage was more contaminated than the seepage which is now appearing in the excavation pit; and 2) the coal tar contaminants are mostly in the form of insoluble tar particles which sink to the bottom of the storage tank and are, therefore, removed by settling. The proposed treatment system for this water is designed to take advantage of these factors.

2.2 Ground-Water Quantity

Seepage water at the 100 Congress Avenue site has been collected and disposed by LPC since it was discovered in early July 1985 by trucking the water off-site to injection wells. The actual records of this contract hauling provide an estimate of the flows that must be handled by the treatment system.

An analysis of these records indicate that the average flow rate into the construction site over the period from 1 August 1985 through 31 January 1986 is approximately 6,100 gallons per day and that daily inflows range from 439 gallons per day to 55,957 gallons per day over this period. A summary of the daily inflow values is shown graphically in Figure 2-3.

Using the data presented in Figure 2-3 it is possible to determine the storage capacity and the treatment rate which is required to store and treat all of the ground-water inflows. One of the most commonly used methods to determine storage requirements is by mass-curve analysis. This method evaluates the cumulative deficiency between inflow (ground-water seepage) and outflow (treatment rate) and selects the maximum cumulative value as the required storage.

The results of this procedure are presented as Table 2-2, which has six columns of data. The first and second are the date and average daily inflow. These data are also shown as Figure 2-3. The third column is the treatment rate in gallons per day. The value of 28,800 gallons per day

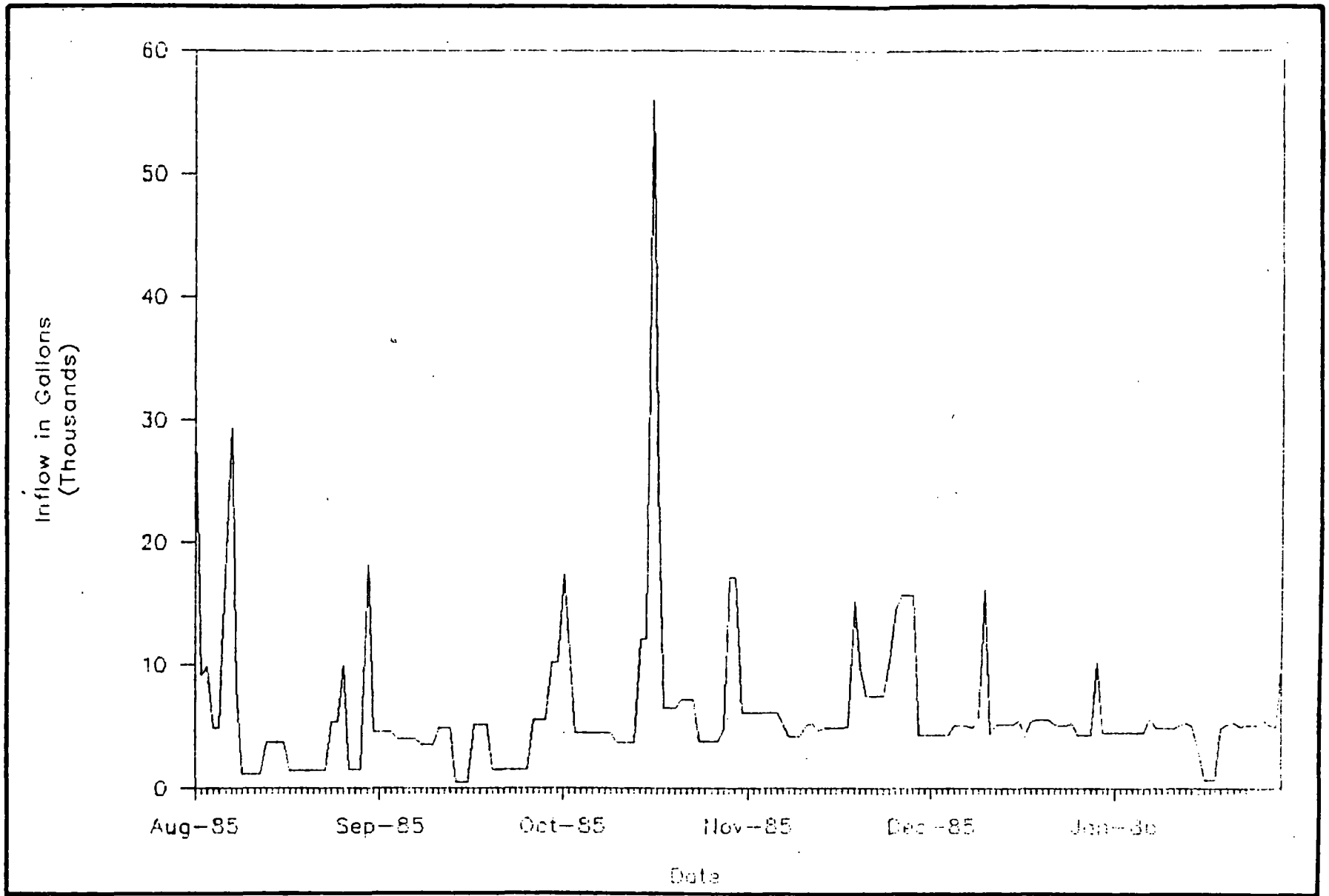

Figure 2-3. Daily Groundwater Inflows at the 100 Congress Avenue Site.

TABLE 2-2. STORAGE REQUIREMENT COMPUTATIONS

Date	Inflow (gpd)	Cumulative Inflow (gal)	Outflow (gpd)	Excess (gal)	Volume in Storage (gal)
01-Aug-85	28958	28958	28800	158	158
02-Aug-85	9140	38098	28800	-19660	0
03-Aug-85	9847	47945	28800	-18953	0
04-Aug-85	4861	52806	28800	-23939	0
05-Aug-85	4861	57667	28800	-23939	0
06-Aug-85	19210	76877	28800	-9590	0
07-Aug-85	29332	106209	28800	532	532
08-Aug-85	8182	114391	28800	-20618	0
09-Aug-85	1064	115455	28800	-27737	0
10-Aug-85	1064	116518	28800	-27737	0
11-Aug-85	1064	117582	28800	-27737	0
12-Aug-85	1064	118645	28800	-27737	0
13-Aug-85	3722	122367	28800	-25079	0
14-Aug-85	3722	126088	28800	-25079	0
15-Aug-85	3722	129810	28800	-25079	0
16-Aug-85	3722	133531	28800	-25079	0
17-Aug-85	1412	134943	28800	-27388	0
18-Aug-85	1412	136355	28800	-27388	0
19-Aug-85	1412	137767	28800	-27388	0
20-Aug-85	1412	139180	28800	-27388	0
21-Aug-85	1412	140592	28800	-27388	0
22-Aug-85	1412	142004	28800	-27388	0
23-Aug-85	1412	143416	28800	-27388	0
24-Aug-85	5278	148694	28800	-23522	0
25-Aug-85	5278	153972	28800	-23522	0
26-Aug-85	9943	163915	28800	-18857	0
27-Aug-85	1523	165438	28800	-27277	0
28-Aug-85	1523	166962	28800	-27277	0
29-Aug-85	1523	168485	28800	-27277	0
30-Aug-85	18204	186689	28800	-10596	0
31-Aug-85	4556	191245	28800	-24244	0
01-Sep-85	4556	195802	28800	-24244	0
02-Sep-85	4556	200358	28800	-24244	0
03-Sep-85	4556	204914	28800	-24244	0
04-Sep-85	3957	208871	28800	-24843	0
05-Sep-85	3957	212828	28800	-24843	0
06-Sep-85	3957	216785	28800	-24843	0
07-Sep-85	3957	220742	28800	-24843	0
08-Sep-85	3464	224206	28800	-25336	0
09-Sep-85	3464	227671	28800	-25336	0
10-Sep-85	3464	231135	28800	-25336	0
11-Sep-85	4897	236032	28800	-23903	0
12-Sep-85	4897	240928	28800	-23903	0

TABLE 2-2. STORAGE REQUIREMENT COMPUTATIONS (continued)

Date	Inflow (gpd)	Cumulative Inflow (gal)	Outflow (gpd)	Excess (gal)	Volume in Storage (gal)
25-Oct-85	3814	533582	28800	-24986	0
26-Oct-85	3814	537396	28800	-24986	0
27-Oct-85	3814	541209	28800	-24986	0
28-Oct-85	3814	545023	28800	-24986	0
29-Oct-85	4721	549744	28800	-24079	0
30-Oct-85	17104	566848	28800	-11696	0
31-Oct-85	17104	583952	28800	-11696	0
01-Nov-85	6077	590029	28800	-22723	0
02-Nov-85	6077	596107	28800	-22723	0
03-Nov-85	6077	602184	28800	-22723	0
04-Nov-85	6077	608261	28800	-22723	0
05-Nov-85	6077	614338	28800	-22723	0
06-Nov-85	6077	620416	28800	-22723	0
07-Nov-85	6077	626493	28800	-22723	0
08-Nov-85	5162	631655	28800	-23638	0
09-Nov-85	4148	635803	28800	-24652	0
10-Nov-85	4148	639950	28800	-24652	0
11-Nov-85	4148	644098	28800	-24652	0
12-Nov-85	5023	649121	28800	-23777	0
13-Nov-85	5193	654314	28800	-23607	0
14-Nov-85	4673	658987	28800	-24127	0
15-Nov-85	4805	663792	28800	-23995	0
16-Nov-85	4834	668626	28800	-23966	0
17-Nov-85	4834	673459	28800	-23966	0
18-Nov-85	4834	678293	28800	-23966	0
19-Nov-85	4968	683261	28800	-23832	0
20-Nov-85	15227	698488	28800	-13573	0
21-Nov-85	9801	708289	28800	-18999	0
22-Nov-85	7445	715734	28800	-21355	0
23-Nov-85	7445	723179	28800	-21355	0
24-Nov-85	7445	730625	28800	-21355	0
25-Nov-85	7445	738070	28800	-21355	0
26-Nov-85	10376	748446	28800	-18424	0
27-Nov-85	14400	762846	28800	-14400	0
28-Nov-85	15643	778489	28800	-13157	0
29-Nov-85	15643	794132	28800	-13157	0
30-Nov-85	15643	809775	28800	-13157	0
01-Dec-85	4232	814007	28800	-24568	0
02-Dec-85	4232	818239	28800	-24568	0
03-Dec-85	4232	822471	28800	-24568	0
04-Dec-85	4232	826703	28800	-24568	0
05-Dec-85	4232	830935	28800	-24568	0
06-Dec-85	4232	835167	28800	-24568	0

TABLE 2-2. STORAGE REQUIREMENT COMPUTATIONS (continued)

Date	Inflow (gpd)	Cumulative Inflow (gal)	Outflow (gpd)	Excess (gal)	Volume in Storage (gal)
07-Dec-85	4985	840152	28800	-23815	0
08-Dec-85	4985	845138	28800	-23815	0
09-Dec-85	4985	850123	28800	-23815	0
10-Dec-85	4850	854973	28800	-23950	0
11-Dec-85	5641	860614	28800	-23159	0
12-Dec-85	16113	876727	28800	-12687	0
13-Dec-85	4386	881113	28800	-24414	0
14-Dec-85	5166	886279	28800	-23634	0
15-Dec-85	5166	891444	28800	-23634	0
16-Dec-85	5166	896610	28800	-23634	0
17-Dec-85	5133	901743	28800	-23667	0
18-Dec-85	5406	907149	28800	-23394	0
19-Dec-85	4168	911317	28800	-24632	0
20-Dec-85	5308	916625	28800	-23492	0
21-Dec-85	5542	922167	28800	-23258	0
22-Dec-85	5542	927708	28800	-23258	0
23-Dec-85	5542	933250	28800	-23258	0
24-Dec-85	5083	938333	28800	-23717	0
25-Dec-85	5015	943347	28800	-23786	0
26-Dec-85	5015	948362	28800	-23786	0
27-Dec-85	5202	953564	28800	-23598	0
28-Dec-85	4331	957895	28800	-24469	0
29-Dec-85	4331	962225	28800	-24469	0
30-Dec-85	4331	966556	28800	-24469	0
31-Dec-85	10283	976839	28800	-18517	0
01-Jan-86	4480	981319	28800	-24320	0
02-Jan-86	4480	985799	28800	-24320	0
03-Jan-86	4480	990279	28800	-24320	0
04-Jan-86	4480	994759	28800	-24320	0
05-Jan-86	4480	999239	28800	-24320	0
06-Jan-86	4480	1003719	28800	-24320	0
07-Jan-86	4480	1008199	28800	-24320	0
08-Jan-86	4480	1012679	28800	-24320	0
09-Jan-86	5586	1018265	28800	-23214	0
10-Jan-86	4879	1023144	28800	-23921	0
11-Jan-86	4879	1028023	28800	-23921	0
12-Jan-86	4879	1032902	28800	-23921	0
13-Jan-86	4879	1037781	28800	-23921	0
14-Jan-86	5008	1042789	28800	-23792	0
15-Jan-86	5241	1048030	28800	-23559	0
16-Jan-86	5004	1053034	28800	-23796	0
17-Jan-86	3008	1056042	28800	-25792	0

TABLE 2-2. STORAGE REQUIREMENT COMPUTATIONS (continued)

Date	Inflow (gpd)	Cumulative Inflow (gal)	Outflow (gpd)	Excess (gal)	Volume in Storage (gal)
18-Jan-86	628	1056670	28800	-28172	0
19-Jan-86	628	1057297	28800	-28172	0
20-Jan-86	628	1057925	28800	-28172	0
21-Jan-86	4869	1062794	28800	-23931	0
22-Jan-86	5111	1067905	28800	-23689	0
23-Jan-86	5205	1073110	28800	-23595	0
24-Jan-86	4939	1078049	28800	-23861	0
25-Jan-86	4985	1083034	28800	-23815	0
26-Jan-86	4985	1088020	28800	-23815	0
27-Jan-86	4985	1093005	28800	-23815	0
28-Jan-86	5380	1098385	28800	-23420	0
29-Jan-86	5040	1103425	28800	-23760	0
30-Jan-86	4934	1108359	28800	-23866	0
31-Jan-86	9768	1118127	28800	-19032	0

corresponds to a treatment rate of 20 gallons per minute. The fourth column is a running total of the ground-water inflow. The fifth column is the difference between in inflow and outflow. The rightmost column is the volume in tank storage and is a running total of the difference between inflow and outflow. Note that storage cannot be less than zero. As can be seen from this table, during normal periods, the 20 gpm treatment system would have been more than adequate to handle the inflows without the need for storage in the 22,000 gallon "FRAC" tank, if the water was treated on a continuous basis.

However it can also be seen that the maximum storage which would have been required with a treatment rate of 20 gallons per minute is 27,157 gallons. This occurred only once during the past months of operation and if the proposed system was used would have required trucking of the contents of the "FRAC" tank on this one day. It is recommended that LPC maintain arrangement with contract haulers to truck the excess water when it is necessary.

Also it is important to emphasize that these storage/inflow calculations do not assume any in-ground storage capacity in the collection systems and sump surrounding the building. These systems have a storage capacity of approximately 8500 gallons; so that during periods when inflows are assumed to "exceed" the capacity of the "FRAC" tank, the actual ground-water collection system has redundant excess storage capacity to allow sufficient time for contract hauling to be brought on-line to handle these increased inflows.

3.0 OVERVIEW OF PROPOSED TREATMENT SYSTEM

An activated carbon treatment system is recommended for pumped groundwater from the 100 Congress Avenue site.

3.1 Activated Carbon Treatment Technology

Activated carbon has been used for many years to remove organics from aqueous streams. There are numerous industrial process applications where it is employed in product purification. It is also widely used as a final treatment process for wastewater cleanup.

Activated carbon is produced by processing coal or other carbon sources in special kilns. Under the proper conditions, large internal surface areas are produced, as high as 1100-1200 square meters per gram. This large surface area is comprised of numerous micropores. On the pore surfaces are many electrically active sites. As organic molecules in water pass through these narrow pores, VanderWaal forces attract and bind the pollutants. Lesser attracted molecules, such as water, continue their migration through the bed.

The nature of the organic molecule has a large impact on the treatment effectiveness of activated carbon. In general, larger (higher molecular weight), low solubility compounds are removed to the highest degree and at the highest loading. Compounds not generally removed by carbon include small alcohols, acetone, methylene chloride, TCE, etc. Higher molecular weight compounds such as phenol and polynuclear aromatic hydrocarbon compounds are controlled very effectively with carbon. Since these compounds were identified in the water at the 100 Congress Avenue site in very low concentrations, the use of activated carbon is the treatment of choice.

3.2 Proposed Treatment System

The proposed treatment system includes gravity settling and equalization in a 22,000-gallon ("FRAC") tank followed by activated carbon filtration on a batch basis if required, depending upon the concentration of contaminants in the tank. Five days of effluent can be treated by the proposed system in one day at normal flows, and the system can handle the maximum daily flow rate experienced in the last four months. Figure 3-1 is a schematic diagram of the proposed system. The activated carbon absorber units are described in an attached technical bulletin together with recommended operating and maintenance procedures.

The proposed treatment system is designed to take advantage of the settling of coal tar particles by maintaining the tank as a settling vessel prior to filtration through the carbon beds. Monitoring of effluent discharges for an indicator parameter, total organic carbon (TOC), will be used to measure system performance quickly and effectively. If the TOC concentration in the effluents from this system is consistently above a specified level, the effluent will be analyzed for the presence of coal tar constituents (total extractable organics) to verify that these constituents are not passing through the carbon beds.

In addition to the treated wastewater, there will be four solid streams from the recommended treatment system -- spent carbon from the activated carbon units, sludge from the FRAC tanks, sludge from the sump pump pit, and sand from sand traps in the excavation. These materials will be tested and disposed of in an appropriate manner in accordance with applicable regulations.

Additional measures, such as secondary containment after treatment (including Imbiber Beads®) are also currently under evaluation.

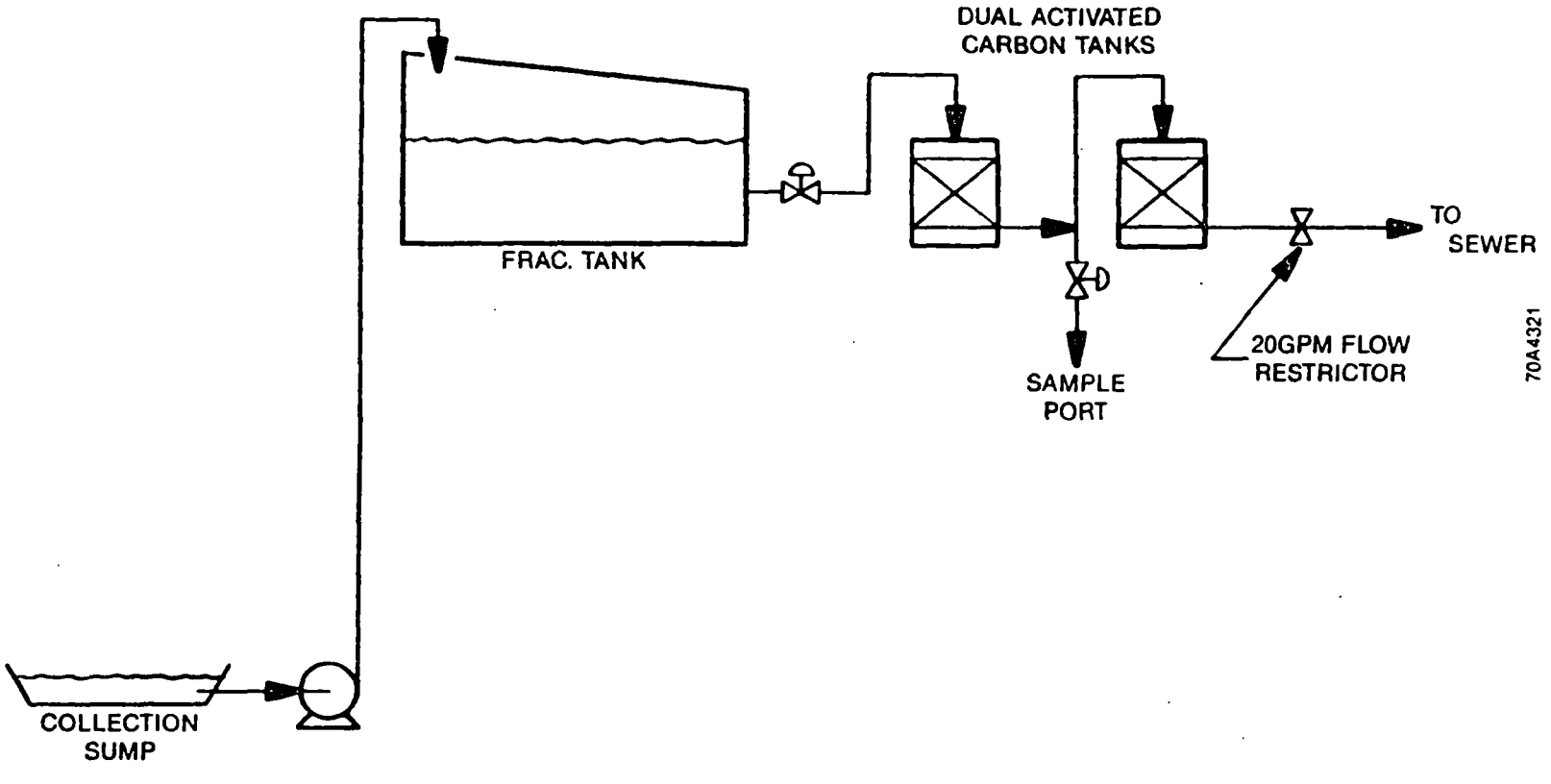

Figure 3-1. Schematic of Proposed Treatment System.

4.0 LABORATORY TREATABILITY TESTS

A laboratory activated carbon isotherm and a column test were performed on a groundwater sample from the 100 Congress Avenue site. Analysis of this groundwater indicated the presence of base/neutral organics as the pollutants of concern. Volatile and acid fraction organics were either not detected or present at extremely low levels.

Table 4-1 shows a comparison of the quality of water before and after passing through a bench-scale carbon column. Also shown are the water quality data from the initial sampling event. As can be seen in the table, the carbon treatment removes virtually all of the coal tar contaminants. The detailed analytical data are contained in Appendix B.

An isotherm was conducted in the laboratory at seven dose levels using Filtrasorb 300 from Calgon. The results of this isotherm in terms of residual total organic carbon (TOC) values are shown in Figure 4-1. The maximum carbon loading for an effluent TOC of 1 mg/L based on this isotherm is approximately 2.5 mg/g. It is important to note that the base/neutral organics identified in the water (anthracene, phenanthrene, napthalene, etc.) are readily sorbable, having adsorption capacities at 1 mg/L equilibrium concentrations of 100–300 mg/g of carbon. A base/neutral analysis of the wastewater after one of the lower carbon dose rates revealed low levels (<10 ug/L) of polynuclear aromatics. Consequently, the organic material which is not readily sorbable is most likely biological in nature (carboxylic acids, alcohols, humic acids, other compounds) that do not originate from the coal tar). These compounds are generally amenable to biological degradation and are most likely the result of normal urban/construction site runoff.

In order to confirm the isotherm information, a column test was run using carbon and the wastewater. The results of this test are presented in Figure 4-2. This figure shows the influent and effluent TOC as a function of the volume of water treated. A sample taken after about 80 bed volumes was

TABLE 4-1. COMPARISON OF WATER QUALITY OF CONTAMINATED GROUND WATER BEFORE AND AFTER ACTIVATED CARBON TREATMENT IN THE LABORATORY

Parameters	From Pit, 7/85 (mg/L)	From FRAC Tank, 10/85 (mg/L)	From Carbon Bed Effluent, 10/85 (mg/L)
Total Volatile Organic Compounds (EPA Method 624)	11.2	0.01	ND[1]
Total Base/Neutral Organic Compounds (EPA Method 625)	56.2	0.05	ND
Total Organic Carbon	NA	20	5
COD	NA	110	7
BOD	NA	4	1
pH	7.3	8.2	8.2

[1]ND = not detected
[2]NA = not analyzed

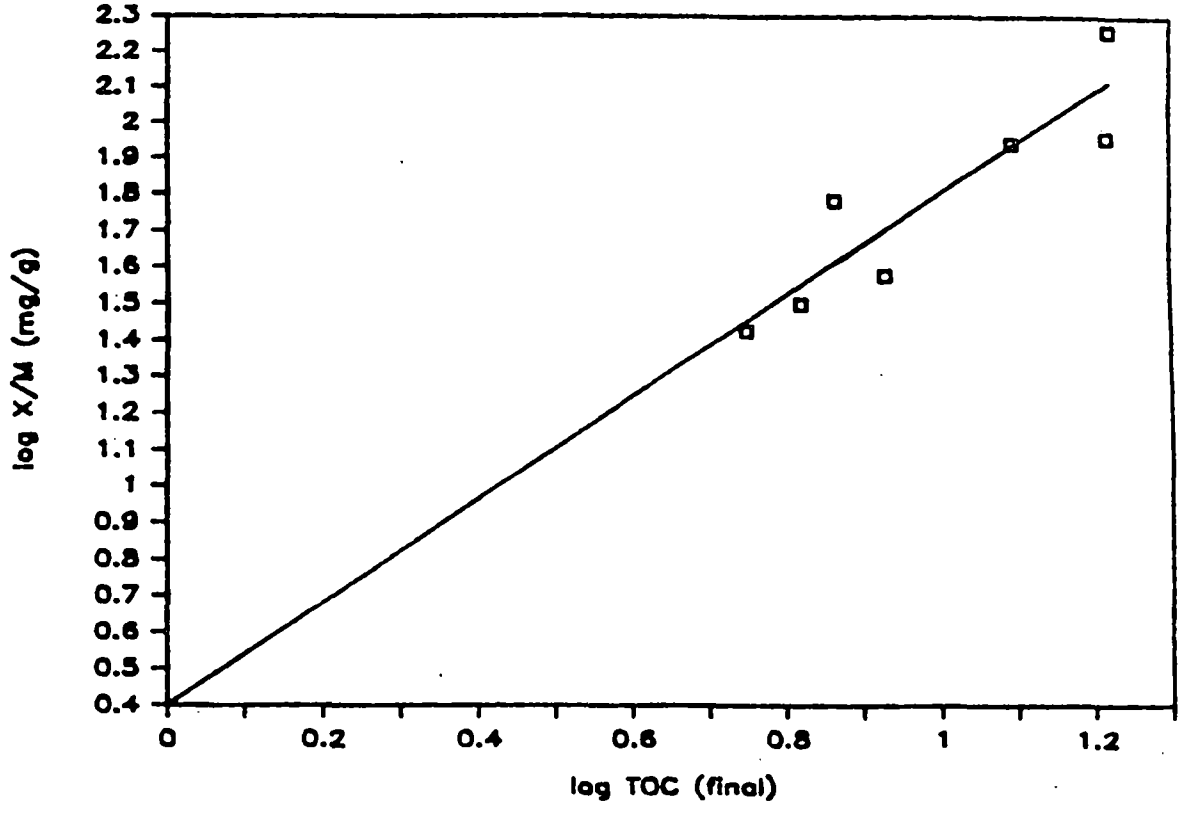

Figure 4-1 Isotherm in terms of residual TOC, 100 Congress Avenue Construction Site

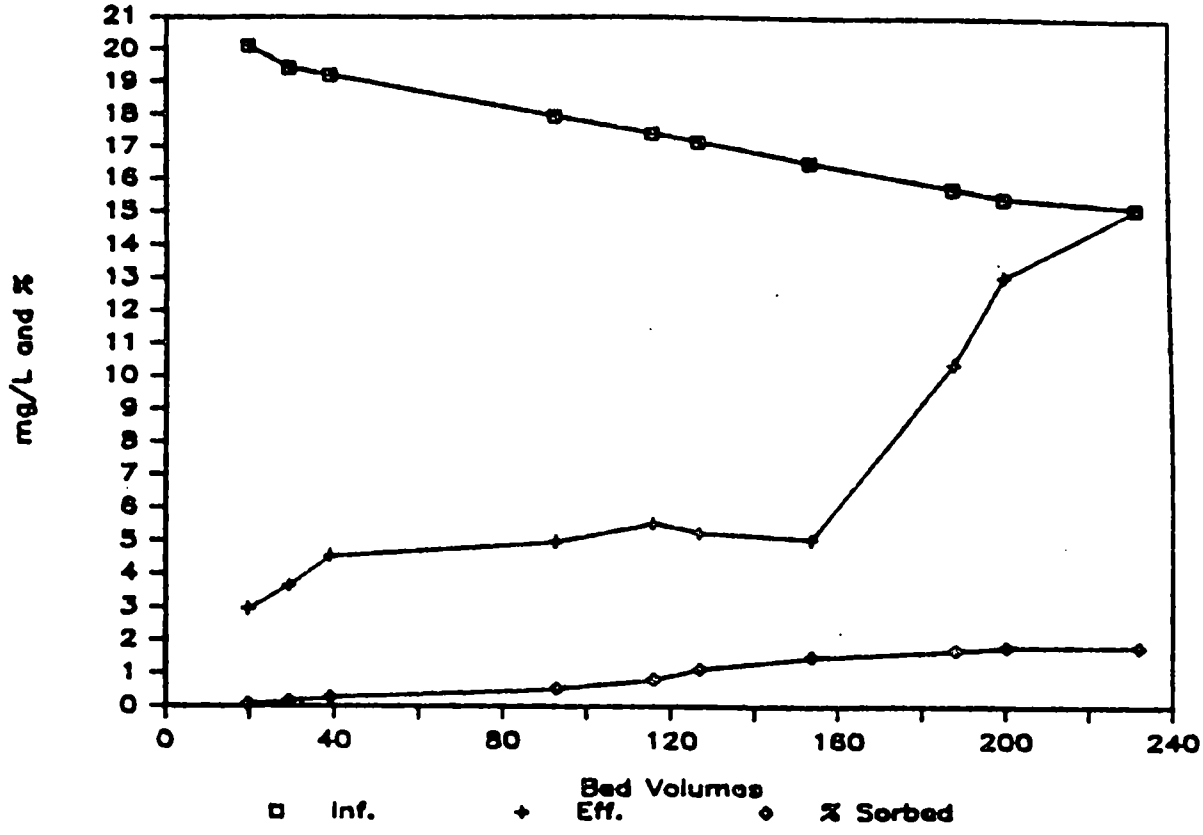

Figure 4-2 GAC Column Test Results, 100 Congress Avenue Construction Site

analyzed for base neutral organics. The only compound identified in this category was a substituted pthalate, possibly contributed by plasticizers in the sample bottle. This indicates that the carbon is doing a very effective job in controlling the toxic organics even though the TOC removal is not high. Consequently, it is difficult to specify the appropriate test to monitor the performance of the activated carbon.

TOC is an easily measured value. However, in this case (as in many other wastewaters), it includes both toxic and non-toxic organic compounds. There are indications that normal construction site runoff is contributing a TOC load which is more amenable to biological degradation than carbon adsorption. Gas chromatography/mass spectroscopy (GC/MS) is used to identify all of the toxic compounds present in the water. Although this is a semi-quantitive measurement, there is a large discrepancy between the sum of toxic organics determined by GC/MS and the TOC value. Consequently, the carbon could be removing all the toxics with only a slight decrease observed in TOC influent and effluent values. This indicates that GC/MS might best be used as the monitoring parameter; however, it is a time-consuming and costly analytical method for routine discharge monitoring.

A more cost-effective and timely measurement would be a total extractable organic (TEO) analysis. In this procedure, the sample is prepared in the same manner as for the base/neutral GC/MS test -- extraction with methylene chloride. This extraction does not remove biological organic compounds. Instead of using the GC/MS, a gas chromatograph is employed. The total area of the chromatogram is obtained and reported as TEO concentration without speciation.

5.0 FIELD TREATMENT DEMONSTRATION

In addition to the laboratory treatability tests, Radian performed a treatment demonstration of contaminated water pumped from the 100 Congress Avenue site. Treatment was accomplished through the use of a dual carbon bed filtration unit. Water samples were taken throughout the field study and analyzed to determine the level of treatment attained.

5.1 Pilot Scale Filtration System

5.1.1 General Description

The skid-mounted carbon filtration pilot unit is used for removing organics from waste water. A sketch of the pilot unit is shown in Figure 5-1. The equipment on the skid consists of the following:

- A pump with motor control;
- Two tanks;
- Flow control valves;
- Piping capable of operating the tanks in series, parallel, or in a backflush mode; and
- Sampling ports.

Each tank (carbon column) has a diameter of 20 inches and the flow rate through the tanks in series is 20 gpm. The Installation and Operation Manual (Appendix A) contains a more detailed description of the system to the reader.

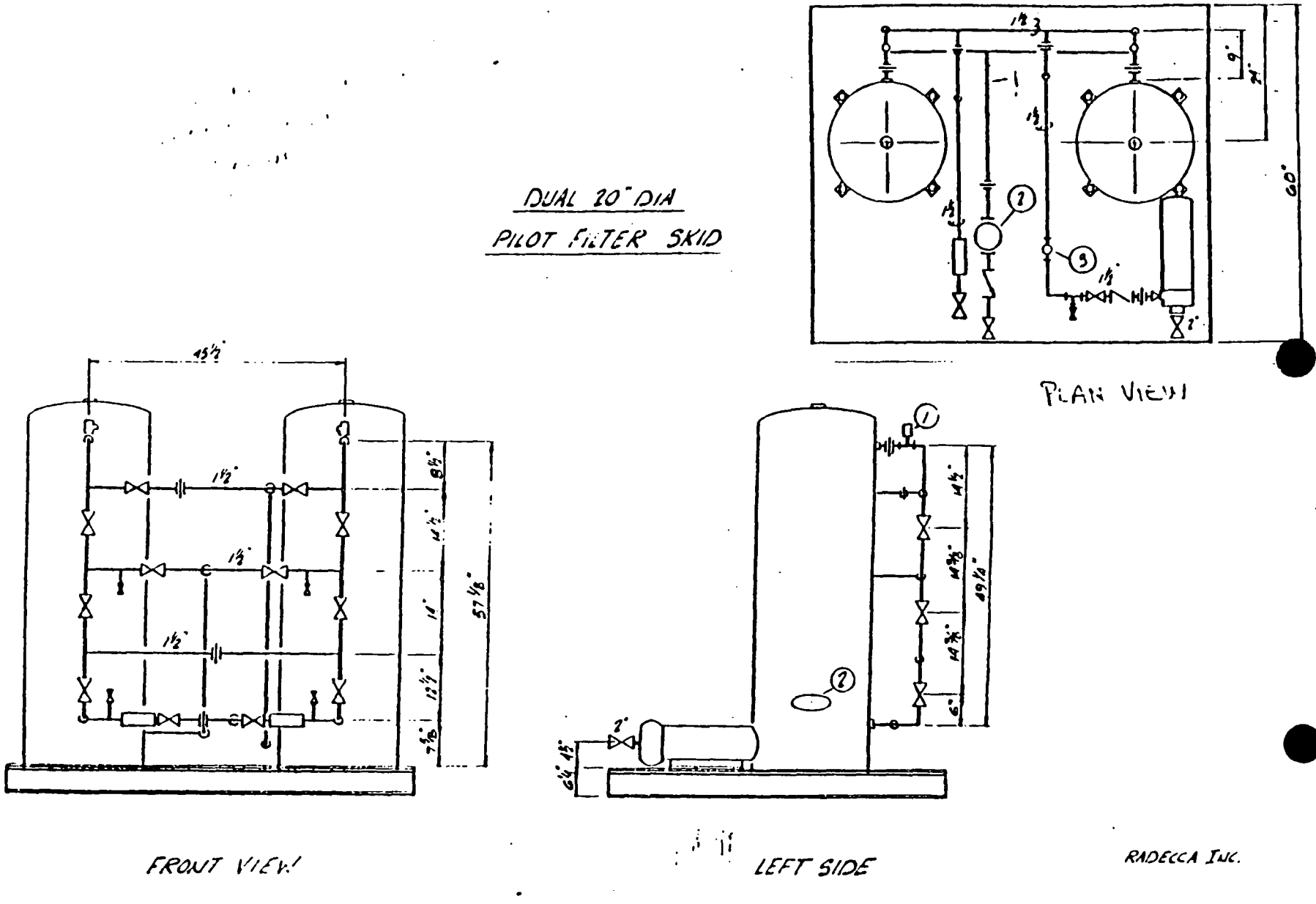

Figure 5-1. Mobile Klensorb System Layout.

5.1.2 Field Preparation

The activities described below were required to prepare the unit for field.

System Flush

The entire unit - tanks, piping, values - were flushed with water to remove accumulated debris and to insure that valves were working.

Tank Loading

Both carbon columns were filled with pea gravel and activated carbon. One bag of pea gravel was placed in the bottom of each tank to cover the underdrain. Three bags of activated carbon were then placed in each tank.

Replace Manhole Gaskets

The manhole at the top of each tank has a gasket which required replacement. New gaskets were cut from a sheet of neoprene rubber.

Pressure Test

After tightening the manholes down, the entire system was filled with water to check for gasket leaks.

Backflush System

The system was backflushed to remove fines from the activated carbon. Water was run through the columns until the effluent was clear.

5.2 Sampling and Analysis

The objective of the sampling and analysis program was to establish the level of treatment attained by adsorption. The approach for achieving this objective was sample collection and analysis followed by comparison of water quality data for the water before and after treatment.

Samples were obtained from sampling ports located at various points of the pilot unit. All sample were labelled using the letters I for influent, E for effluent, and B for field blank. Samples were logged in on standard chain-of-custody forms. All samples were preserved in the field.

Table 5-1 lists the analytical parameters, containers used for sample collection, preservatives used, and labelling codes.

5.3 Treatment Demonstration

The pilot unit was taken to the site on 21 February 1986. A submersible pump was lowered to the bottom of the FRAC Tank (wastewater storage reservoir). The pump discharge hose was routed to the intake of the pilot unit. The discharge line from the pilot unit was fed back to the top of the tank. This arrangement provided circulation of the wastewater through the tank for equal treatment. This also precluded the need for using the pump system on the pilot unit. Valves were positioned to operate the carbon columns in series, allowing the greatest sorbent-wastewater contact.

Treatment was performed over a continuous 26-hour period on 24 and 25 February 1986. During this time, two influent samples were taken to determine any variability in wastewater quality and three effluent samples were taken to determine the level of treatment attained. A complete set of field blanks was also provided for laboratory analysis.

TABLE 5-1. ANALYSIS OF WATER SAMPLES

Parameter	Container	Preservative	Label Code
pH, Chlorides, TDS, TSS, BOD, Sulfates	1-L plastic	4°C	pH
Settleable Matter	1-L plastic	4°C	S
COD, Phosphates, Phenols	500-ml glass	H_2SO_4 (pH <2), 4°C	COD
Cyanide	250-ml plastic	NaOH (pH >10), 4°C	CY
Formaldehyde	500-ml glass	4°C	F
Metals	500-ml plastic	HNO_3 (pH <2), 4°C	M
Acids and Base/ Neutrals (EPA 625)	1-L glass	4°C	ABN
Volatiles (EPA 624)	40-ml glass (2)	4°C	VOA

Table 5-2 lists the time samples were taken and the labeling scheme used.

Attachment A provides recommended operation and maintenance procedures used during treatment operations at 100 Congress Avenue site.

5.4 Results

Laboratory analytical data are appended to this report. Table 5-3 summarizes these results. The data generated during the treatment demonstration indicate that the levels of coal tar contaminants in the water obtained from the "FRAC" tank during the treatment demonstration were at or below analytical detection limits.

TABLE 5-2. COLLECTION OF WATER SAMPLES FROM FIELD DEMONSTRATION UNIT

Date	Time	Sample Obtained	Label*
24 February	9:50 AM	Influent	I-1 - Code
24 February	10:15 AM	Effluent	E-1 - Code
24 February	2:00 PM	Effluent	E-2 - Code
24 February	--	Field Blank	B-1 - Code
25 February	9:55 AM	Influent	I-2 - Code
25 February	10:20 AM	Effluent	E-3 - Code

*'Code' refers to the appropriate label code listed in Table 5-1 for each sample container.

TABLE 5-3. SUMMARY OF ANALYTICAL RESULTS FROM FIELD TREATMENT DEMONSTRATION AT 100 CONGRESS AVENUE SITE

Parameters	Influent (I-1)	Influent (I-2)	Effluent (E-1)	Effluent (E-2)	Effluent (E-3)
Total Volatile Organics (mg/L)	ND[1]	NA[2]	ND	ND	NA
Total Base Neutral[3] (mg/L)	ND	ND	ND	ND	ND
Total Acid Fraction[4] (mg/L)	ND	ND	ND	ND	ND
COD (mg/L)	<5	21	<5	15	13
BOD (mg/L)	12	9	3	4	7
pH (pH units)	8.8	8.22	8.83	8.71	8.58

[1]ND = Not Detected.
[2]NA = Not Analyzed.
[3]Some detectable phthalate compounds found which are interpreted to be lab or field contamination.
[4]Very low levels (1-3 µg/L) at phenols found in some effluent samples.

6.0 RECOMMENDED TREATMENT AND MONITORING PROGRAM

Based upon laboratory and field tests, Radian recommends that a skid-mounted activated carbon unit be used for treatment of groundwater pumped from the 100 Congress Avenue site. This treatment system is recommended as the most cost-effective and environmentally sound procedure available. The use of activated carbon to control toxic organics is well documented and considered to be a tertiary treatment, a step above the wastewater treatment practices of the City of Austin. The small flow (<10 gpm) of detoxified water would have a negligible impact on the wastewater treatment system or the receiving body of water.

The following specific procedures are recommended.

Treatment and Discharge. The water should continue to be collected in a 22,000 gallon FRAC tank. The solids should be allowed to settle, and the water should then be treated by activated carbon in a skid-mounted unit as described above. The treatment will be for hazardous organic constituents in two columns operated in series. Discharge may then be either to the City of Austin wastewater treatment system (preferable) or to the storm sewer.

Monitoring. Weekly sampling should be conducted from the first and second carbon column effluents. Analysis should be routinely for total organic carbon. If the concentration of TOC exceeds 20 mg/L, monitoring for total excractable organics should be initiated. When the TEO concentration exceeds 0.5 mg/L, the activated carbon should be replaced. Monitoring for both TOC and TEO should continue as long as the concentration of TOC remains above 20 mg/L and TEO remains below 0.5 mg/L. If TOC levels fall below 20 mg/L, TEO monitoring may be discontinued.

Although the monitoring limits are somewhat unusual, Radian feels they are justified because of the uniqueness of the situation. The wastewater

composition is highly variable, dependent upon such conditions as recent rainfall and construction site operations. As demonstrated by the isotherm and column tests, TOC effluent levels of 5-15 ppm do not contain any toxic organics after contact with carbon. Consequently, as long as the TOC is being removed across the carbon, it is most probable that no toxics are being discharged. If, due to unforeseen circumstances, the TOC should exceed 20 mg/L in the effluent, LPC has the option of either replacing the carbon or performing the total extractable organic analysis to determine if breakthrough has occurred. If the TEO result is above 0.5 mg/L, the carbon will be replaced.

In addition to the treated wastewater, there will be four solid streams from the recommended treatment system -- spent carbon from the activated carbon units, sludge from the FRAC tanks, sludge from the sump pump pit, and sand from sand traps in the excavation. These materials will be tested and disposed of in an appropriate manner in accordance with applicable regulations.

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APPENDIX A

Operation and Maintenance Procedures for the Pilot Filtration System and Installation and Operation of Mobile KLENSORB Systems Manual

RADIAN
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OPERATION AND MAINTENANCE PROCEDURES FOR THE PILOT FILTRATION SYSTEM

The pilot filtration unit is a fairly simple unit process. Once installed and operational, it will require minimal observation. The system is capable of automatic operation which should be utilized. Operation of the unit is envisioned as follows.

A surge/separation tank will be required to store raw water. A level switch in this tank will be used to operated the pump on the pilot unit. It is recommended that the switch shut off the pump when 2-3 feet of water remain in the tank. This will provide adequate surge volume for additional water and a net positive suction head for the pump. The valves will remain in a standard configuration without adjustment.

Daily readings should include pressure drop across the two tanks, pump pressure, and volume of water treated. Table 1 is a suggested operating data sheet. When the pressure drop across the beds double, each tank should be backwashed for 10-15 minutes. The procedures for backwashing and the proper valve configurations are presented in the attached Installation Manual. The pump bearings should be greased on a semi-monthly basis. Replacement of the activated carbon will be required periodically based on the analytical results. The procedure for evacuating and loading the columns is presented in the manual also. Any other operating or maintenance problems should be referred to Radian personnel. Spare fuses are located in the control panel in the event of a power failure. Mechanically, plugging of the lines is the only potential problem envisioned.

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CORPORATION

TABLE 1

Pilot Filtration System Operating Log

Date	Time	Pressure Drop		Pump Pressure	Volume	Comments
		Tank 1	Tank 2			

INSTALLATION AND OPERATION OF MOBILE KLENSORB SYSTEMS

BY

GREG P. BEHRENS

RADECCA INC.

P.O. BOX 9948

AUSTIN, TEXAS

78766

CONTENTS

INTRODUCTION

This document serves as a reference for the installation and operation of Radecca's Mobile Klensorb Systems (MKS), skid mounted pilot systems for removing organics from wastewater. The equipment on the skids consists of a pump with a motor control wired to accept either 240 or 480V three phase service, two tanks, flow control valves, a totalizer, differential pressure gauges, and piping capable of operating the tanks in series, parallel, or in a backflush mode. Table 1 identifies the various MKS systems owned by Radecca and their sizes and peculiarities. Figures 1, 2, and 3 are diagrams of the MKS. Figure 3 shows the locations of the valves on the MKS. These valves are identified by number in Table 2.

TABLE 1

Radecca Mobile Klensorb Systems

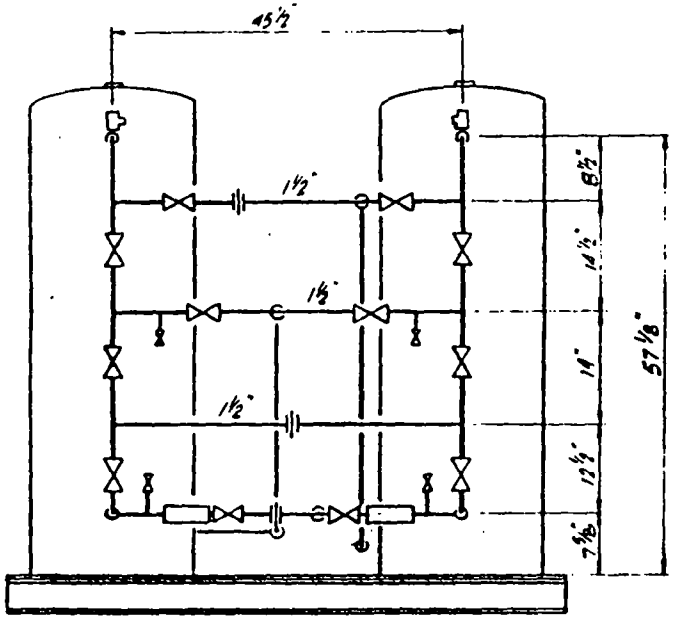
Unit	Tank Diameter (in.)	Series Flow Rate (gpm)	Other
01 MKS	20	10	
02 MKS	30	20	
03 MKS	30	20	Trailer
04 MKS	30	20	Trailer, Explosion proof

INSTALLATION

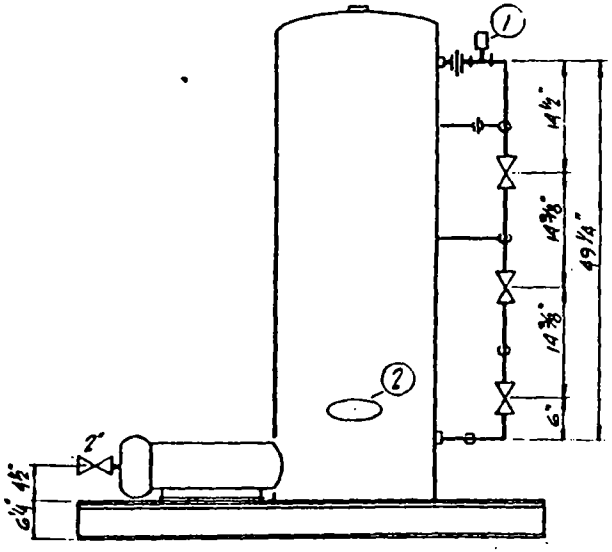
The MKS are either trailer or skid mounted. The skid unit, 8' X 6'6", is approximately 7'6" high. Empty weight is about 3500 pounds (the 01-MKS is 5' X 6' X 6' high, 2500 pounds). Fork lift slots (54" center to center) are located on both 8' sides. Lifting lugs are also located on all four corners of the skid for placement with a crane. Spreader bars 10 feet in length should be used with a crane to avoid equipment damage.

DUAL 20" DIA
PILOT FILTER SKID

① PSV (1)
② CLEAN OUT (2)



FRONT VIEW



LEFT SIDE

RADECCA INC.

HOUSTON **DATUM CO.** TEXAS

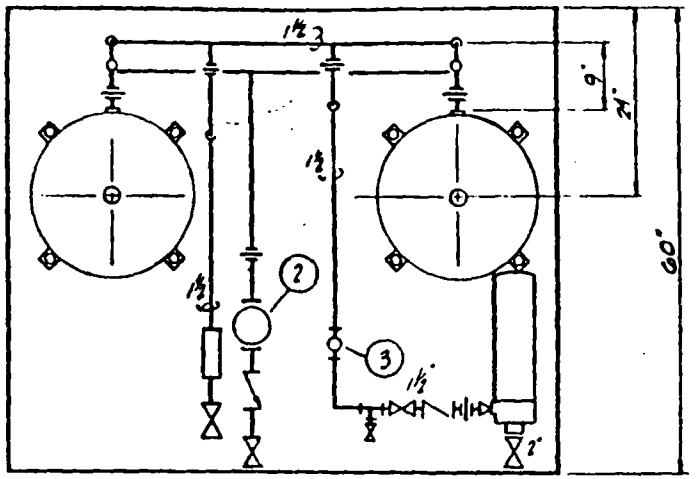
PILOT FILTER SKID

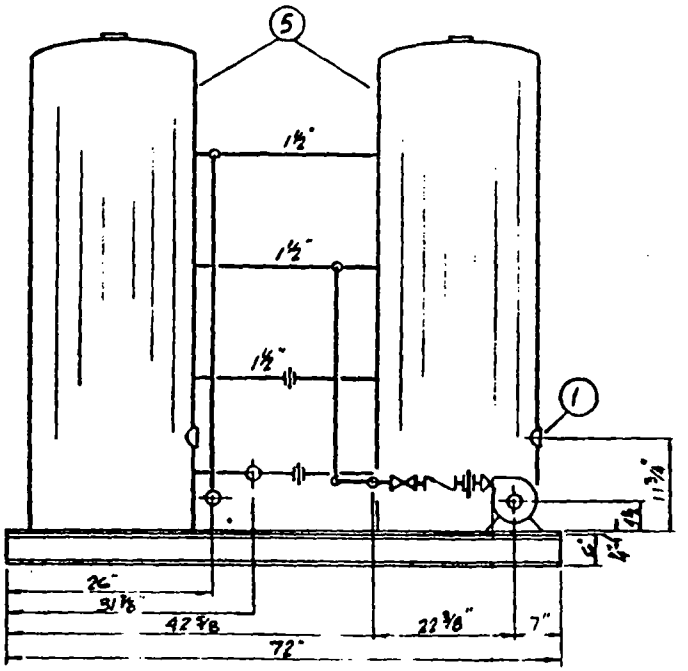
8919

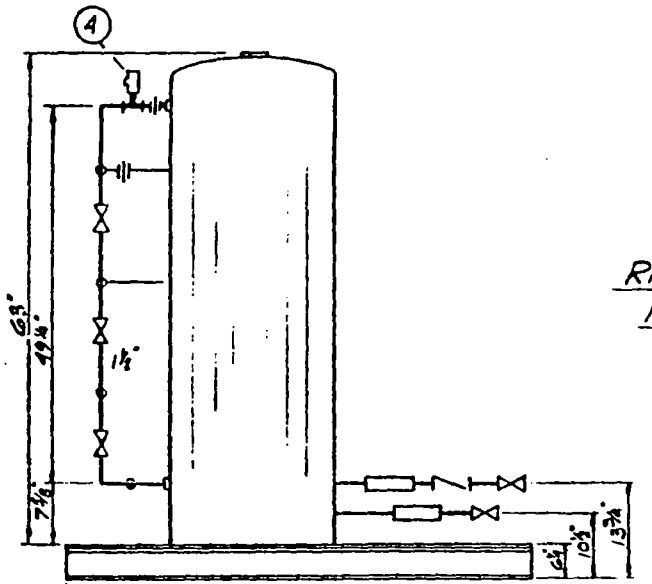
A-12118

DUAL 20" DIA. PILOT FILTER SKID

1. CLEAN OUT (2)
2. FLOW METER
3. PRESSURE GAGE
4. PSV (2)
5. 20" DIA. - 5'-0" SS (2)







RADECCA INC.
P.O.NO. 100

	AS BUILT	11-22-88				

HOUSTON DATUM CO. TEXAS

PILOT FILTER SKID

RADECCA INC.

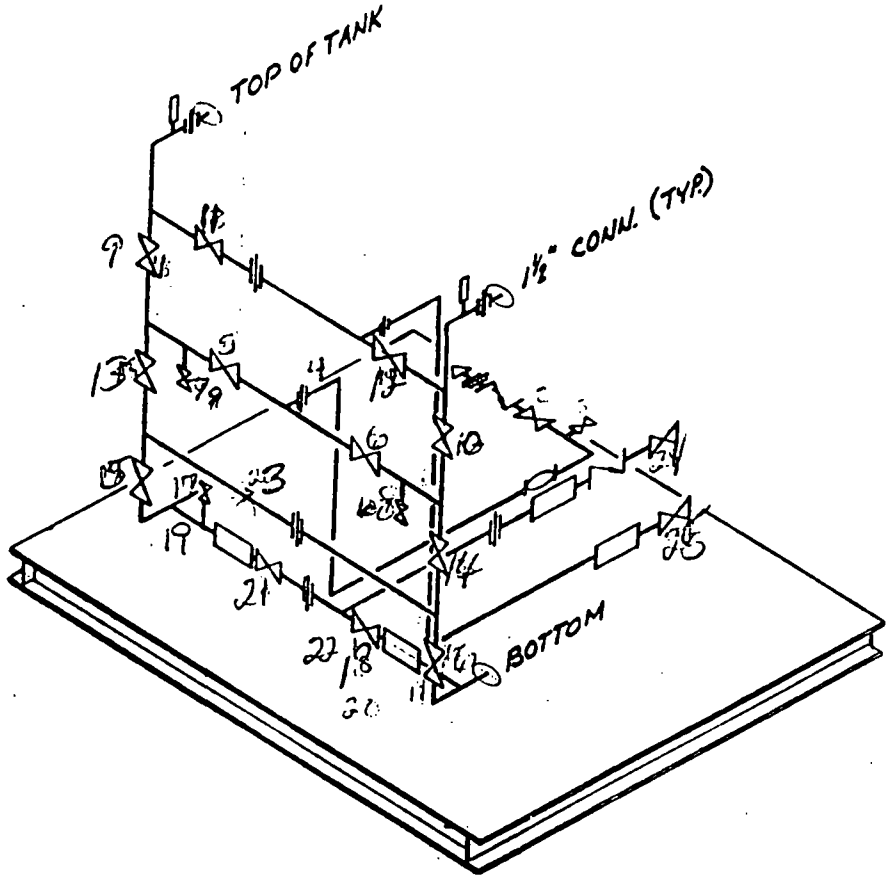
8947

A-121117

PLUS 3 SAMPLING VALVES

2 EVACUATION VALVES

DUAL 20" DIA. PILOT FILTER SKID



NOTE! TANKS ARE NOT SHOWN

FOR DIMENSION SEE PLAN & ELEVATION DWGS.

RADECCA INC.
P.O. NO. 100

DATUM CO.
HOUSTON TEXAS
PILOT FILTER SKID
RADECCA INC.
8949
A-13119

TABLE 2 - VALVE IDENTIFICATION

1	Pump Suction
2	Pump Discharge
3	Alternate Supply Line
4	Inlet Sample
5	Left Tank Feed
6	Right Tank Feed
7	Left High Side ΔP
8	Right High Side ΔP
9	Left Normal Feed
10	Right Normal Feed
11	Left Backflush
12	Right Backflush
13	Left Midvalve
14	Right Midvalve
15	Left Upflow
16	Right Upflow
17	Left Low Side ΔP
18	Right Low Side ΔP
19	Left Tank Sample
20	Right Tank Sample
21	Left Normal Effluent
22	Right Normal Effluent
23	Crossover
24	Effluent
25	Backflush
26	Left Tank Purge
27	Right Tank Purge

The trailer mounted unit is about 9' high with a tandem axle. Four stabilizers are located at each corner of the unit which are used to prevent tire damage during operation. Either type of unit is entirely weatherproof, allowing indoor or outdoor installation. The units have no freeze protection.

Piping

The skid mounted pump will be used in most applications. An alternate feed connection (V3) is available if the wastewater is available under pressure (20 psi or greater). The pump suction has a 1-1/2" threaded (female) ball valve (V1) for connection to the wastewater supply. (01-MKS has a 2" ball valve.) It is recommended that a foot valve be installed in the supply line to prevent loss of pump prime. The pump has an operating suction head of 20 feet. Further information about the pump is given at the back of this document. If a pressurized supply line is available, flow enters the system downstream of the pump at V3, a 1-1/2" threaded (female) ball valve. Effluent from the MKS flows from V24, a 1-1/2" threaded (female) ball valve. The backflush line, V25, is also a 1-1/2" threaded ball valve. The tank purge valves 26 and 27 are 1-1/2" on 01 and 02-MKS, 2" ball valves on 03 and 04-MKS.

Electrical

If the skid mounted pump is used, electrical power is required to run the motor. The motor supplied is a 3 horsepower, totally enclosed fan cooled (TEFC) model. The 04-MKS also has an explosion proof control box. The control panel has been designed to accept either a 240 (30 amp) or 480V (15 amp) three phase power supply. A blueprint is located in the jacket on the inside of the weatherproof control door panel. The various parts in the panel are identified in the back of this document. A lug is

supplied to accept a ground wire from the service voltage grounding system. The supply line must be sized per the National Electric Code to match the owner supplied feeder breaker. If the power supply is floating (delta), then a ground rod should be installed per the National Electric Code and connected to the ground lug in the panel. The incoming service should be routed through the conduit opening at the bottom of the control panel and connected to the line side of the circuit breaker (CB1).

In order to start the pump for the first time, first place the 480/240 V selector switch (SW1) in the correct service voltage position. Verify that the hand-off-auto switch (SW2) on the control panel door is in the off position, also verify that the circuit breaker is off. Turn on the service voltage and verify that all three phases are available on the CB1 input terminals. Next turn on CB1. Turn the H-O-A switch to the hand position. The motor should run. There are two probable causes if the motor does not run. First check the appropriate over/under voltage relay. If one of the LED's is lit, adjustment of the related trip set point is required. Turn off SW2 and CB1, adjust the set point, and reapply power. NOTE: The LED is difficult to see in bright light. If the motor still does not run, reverse any two of the incoming leads, after deenergizing the feeder breaker. This should cause the motor to run. The motor will not turn in the wrong direction if the leads are improperly connected.

If the motor still does not run, test all the fuses to verify that voltage is available on each side of the terminal. A qualified electrician should perform this operation to prevent personnel or equipment damage. In certain applications, it may be desirable to operate this system on automatic level control. The control panel has the capability of automatic operation. This option should be discussed with a Radecca engineer prior to operation of the unit.

Sorbent Loading

The columns are equipped with an underdrain manifold system and a backflush header. Pea gravel should be loaded into the column to a level 3-4" above the underdrain. This is approximately at the bottom lip of the manhole. Sorbent material can then be loaded in the top manhole to a depth of 2-3 feet (6-9 drums per column). The manholes should then be replaced and checked for gasket leaks by filling the columns with water before commencing operation.

OPERATION

Operation of the MKS is fairly straight forward and is discussed below, however, two associated actions, backflushing and disposal of spent sorbent, require some instructions.

Backflushing

Prior to using the MKS, it is necessary to backflush the sorbent to remove anthracite fines which can cause excessive bed pressure drop. The anthracite is currently used in the sorbent formulation as a diluent to improve the flow characteristics of the sorbent bed. Backflushing is accomplished by flowing clean or process water up through the columns. Table 3 lists the valve settings for various backflush operations. The water exits the skid at V25. Backflushing should be maintained until the effluent is free of fines. The columns can be backflushed singly, in parallel, or while one column is in operation. The flow rate is held to about 10 gpm per column by a flow control valve. The pump pressure gauge should read 55-60 psig at the proper flow rate. The 01 and 02 MKS systems have only single flow control valves which are set at 5 and 10 gpm respectively.

TABLE 3

Backflush Valve Settings

Valve	Backflush Left Tank	Backflush Right Tank	Backflush Both Tanks	Backflush* Left, Flow Right	Backflush* Right, Flow Left
1	X	X	X	X	X
2	X	X	X	X	X
3					
4					
5	X		X	X	X
6		X	X	X	X
7					X
8				X	
9					X
10				X	
11	X		X	X	
12		X	X		X
13	X		X	X	
14		X	X		X
15	X		X	X	
16		X	X		X
17					X
18				X	
19					
20					
21					X
22				X	
23					
24				X	X
25	X	X	X	X	X
26					
27					

Unless checked, valve is closed.

* Cannot be done with O1-MKS, V23 not present.

In Service

The columns can be operated singly, in series, or in a parallel mode. Flow control valves limit the capacity of each column to 20 gpm, regardless of single or series operation (10 gpm for 01 MKS). Parallel operation produces a flow of 40 gpm. Table 4 details the valve position for the various configurations.

Normally, series flow is used. This allows for the greatest sorbent-wastewater contact. Additionally, samples of the effluent from the first column can be analyzed to determine breakthrough before the effluent quality deteriorates. When the first column is exhausted, the sorbent can be changed and the contactors reversed in order to consume the sorbent in the second tank while polishing with the new material.

Each column is also equipped with a differential pressure gauge. Fresh beds typically have pressure drops of less than 5 psi after adequate back-washing. The MKS is equipped with a flow totalizer which records the volume of wastewater treated. With experience, the user should be able to predict sorbent exhaustion based on the volume of water treated. Pressure relief valves on each column are set at 100 psi. Each contactor is rated at a maximum pressure of 125 psi.

Sorbent Removal

Changing the sorbent will be necessary on a periodic basis, which can be estimated using the flow rate and inlet organic concentration. Figure 4 can be used as an approximation of the sorbent life for oily wastewaters. For example, a 100 ppm oil stream should be effectively treated for 16 days if 9 drums of sorbent are used.

TABLE 4

Valve Settings For Inservice Flow

VALVE	FLOW THROUGH LEFT TANK	FLOW THROUGH RIGHT TANK	PARALLEL FLOW	SERIES RIGHT TO LEFT	SERIES LEFT TO RIGHT
1	X	X	X	X	X
2	X	X	X	X	X
3					
4					
5	X		X		X
6		X	X	X	
7	X		X	X	X
8		X	X	X	X
9	X		X	X	X
10		X	X	X	X
11					
12					
13				X	
14					X
15					X
16				X	
17	X		X	X	X
18		X	X	X	X
19					
20					
21	X		X	X	
22		X	X		X
23				X	X
24	X	X	X	X	X
25					
26					
27					

* Unless checked, valve is closed.

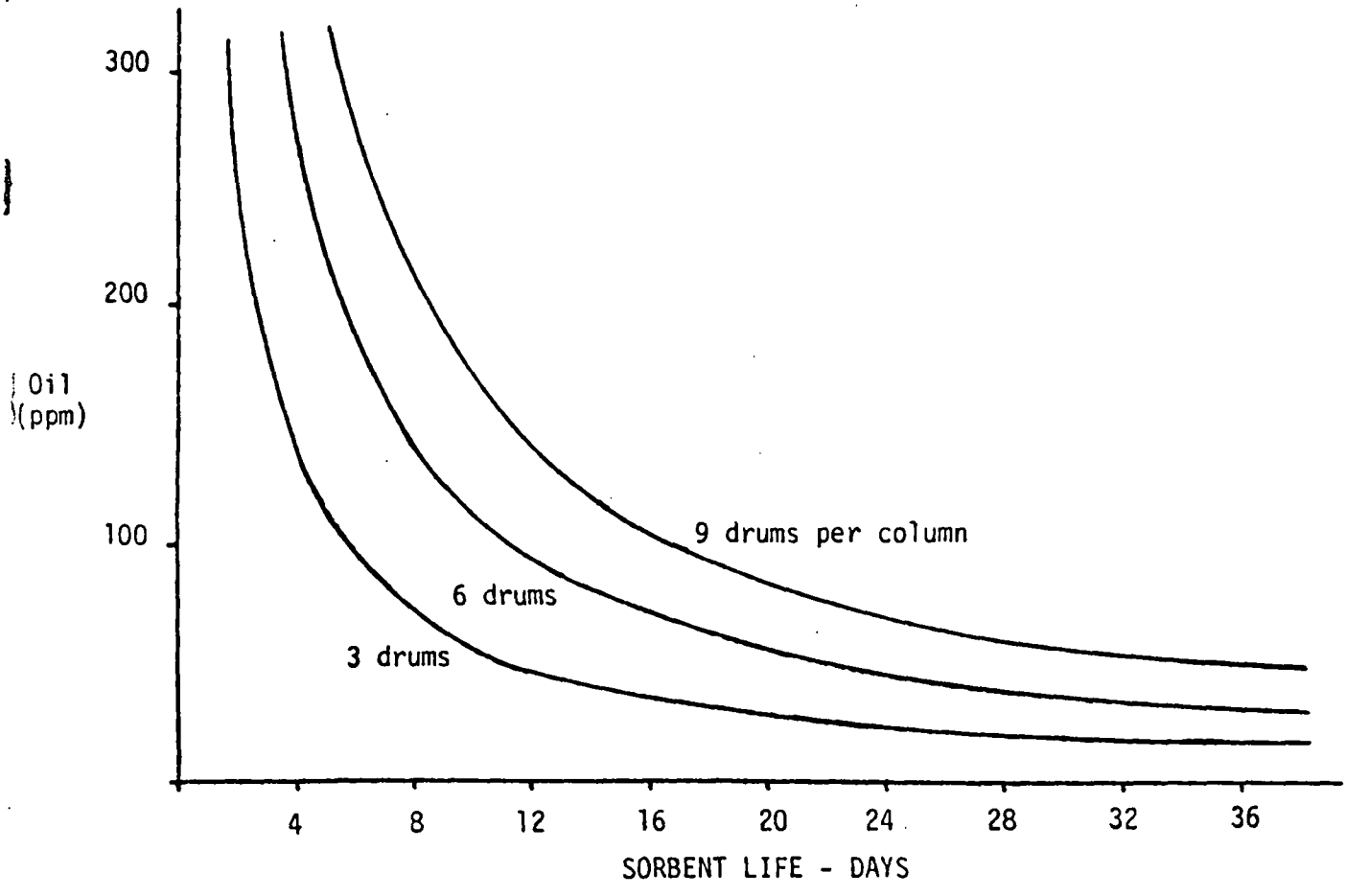


Figure 4 - Approximate Sorbent Life vs. Oil Concentration
(20 gpm, single column calculation)

TABLE 5

Valve Settings for Evacuating Columns

Valve	Empty Left	Empty Right
1	X	X
2	X	X
3		
4		
5	X	
6		X
7		
7		
9		
10		
11		
12		
13	X	
14		X
15	X	
16		X
17		
18		
19		
20		
21		
22		
23		
24		
25		
26	X	
27		X

EQUIPMENT

INFORMATION

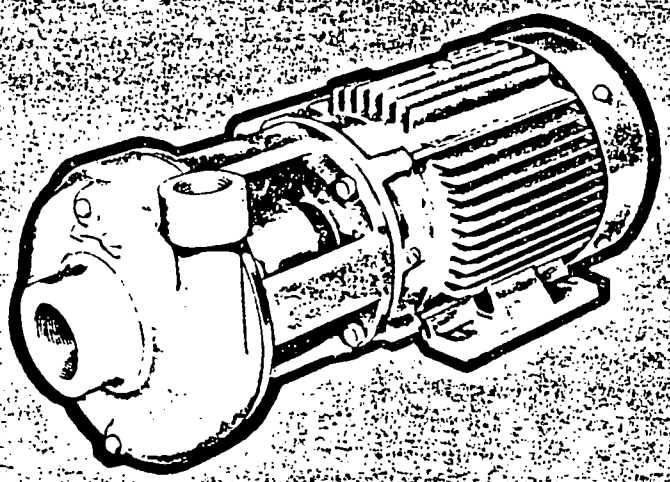
PRICE PUMP CO.

CLOSE COUPLED CENTRIFUGAL MOTOR PUMPS

TYPE AB-SS

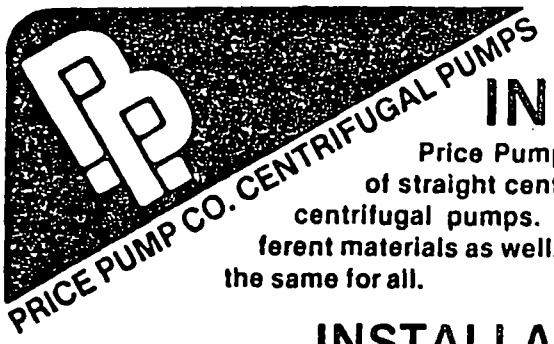
WITH SINGLE TYPE 21 SEAL

316 Stainless Steel



INSTALLATION OPERATING MAINTENANCE

INSTRUCTIONS



GENERAL INSTRUCTIONS

Price Pump Co. produces several models of straight centrifugal pumps and self-priming centrifugal pumps. They are made of several different materials as well. In general, the instructions are the same for all.

INSTALLATION

Base Mounted Pumps (Pedestal Pumps)

These pumps should be mounted on a rigid steel base that will not warp or flex. Each pump must be mounted in such a way that the **pump shaft centerline is on center with the driver shaft centerline.** Pads and/or shims will be required on either pump, driver or both. The two shafts should not butt and distance between them will depend on coupling used. Do use a flexible coupling and align it properly using straight edges and/or indicators. **Misalignment will cause bearing failure and void warranty.** Pulley driven pumps must have pulleys in line and good belt tightness practices followed.

Close Coupled - Motor Pumps

These pumps require no special care in mounting, although it is suggested that they be firmly bolted to whatever surface is used. Adequate air movement over motor will help prevent overloads.

Piping

All piping should be supported independently of the pump. Do not place a strain on the volute. All suction and discharge should be made as short and direct as possible to reduce the friction head.

1. **Suction Piping** — always place the end of the a suction pipe at least three feet below the surface of the liquid to prevent air from being drawn into the pump, as air leaks will cause the pump to lose prime, Horizontal lines of suction pipe should slope downward from the pump to avoid air pockets. Provide a strainer if possible. Suction lines must be at least the same size as inlet, or the next size larger, if possible.

2. **Discharge Piping** — It is advisable to install a valve (Gate, Globe or Ball) and a check valve in the discharge line and close to the pump. The valve can be used to control the pump flow (closing valve increases friction loss, thus increasing head and reducing flow). It also allows the line to be shut if repairs are being made. A check valve will prevent back flow when pump is shut down.

3. If pump is installed above the liquid, a check or foot valve must be installed in the suction line, if the pump is not a self-priming unit, at the

furthest possible point from the pump. Use a suction no smaller than the suction size of the pump. If the line has several els, etc., we suggest using the next larger size.

4. **Suction Lift** — static plus friction, must not exceed that recommended. Vapor pressure must be considered also. Contact factory for NPSH required.

OPERATING

Centrifugal pumps must receive an initial prime in **ALL** cases.

1. **Priming** — Do not start pump before priming, except to check for **proper rotation.** Running in reverse may cause impeller to spin off. Merely jog switch to check rotation. **Do not** run pump with liquid in reverse, as this will increase possibility of impeller spinning off. Completely fill the pump volute and suction line. Remove air from volute by removing top pipe plug of volute while filling. After filling, check by turning pump shaft a few times. Add more water if required. It is suggested that during initial start-up that the discharge valve be closed and gradually opened as motor developes full r.p.m. This allows a gradual build up of power requirement. If pump does not build up pressure as motor develops speed, shut down and reprime. Do not attempt to prime pump or add liquid while pump is in operation.

2. **Starting a new or repaired pump** — Follow instruction above after first checking for proper rotation. Also make sure impeller turns freely within the volute. Sometimes a new seal will leak slightly, but this should disappear within a few hours.

MAINTENANCE

1. **Motor Pumps** — If sleeve-ball combination motors are supplied, the sleeve should be relubricated with the proper oil every six to twelve months as indicated on the motor.

2. **Servicing & Repair** — For specific seal service instructions and parts drawings and repair parts lists please read the other side of this pamphlet.

TROUBLE SHOOTING:

1. **No liquid delivered:**
   a. Pump not primed.
   b. Speed too low. Check voltage and frequency of driver, pulley selection, etc.
   c. Air leak in suction.
   d. Discharge head too high for pump. Use larger lines and reduce els, etc. or a different pump model.
   e. Suction lift too high. Consider vapor pressure and temperature. Increase size of suction pipe. Relocate pump.
   f. Incorrect rotation. Must rotate in direction of arrow cast on volute.

2. **Not enough liquid delivered:**
   a. Air leaks in suction.
   b. Speed too low
   c. Discharge head too high or higher than calculated
   d. Inadequate suction head to hot liquid.
   e. Impeller or volute worn.
   f. Excessive clearance between volute and impeller of semi-open impeller pumps. Reset by loosening set screws of bearing adapter (Pedestal Pumps) or pump shaft (Motor Pumps) and move impeller toward volute. Recommend clearance is .010"
   g. Suction not submerged enough, causing air to enter suction line.

3. **Not enough pressure:**
   a. Speed too low.
   b. Air or gas in liquid or leaking suction line.
   c. Damaged Impeller.

4. **Pump gradually loses suction:**
   a. Leaky suction line
   b. Too high suction lift.
   c. Open end of suction line.
   d. Air or gas in liquid.

5. **Motor runs hot.** (Note: Most motors will feel hot even when not overloaded.)
   a. Discharge head too low or lower than calculated causing pump to deliver a higher volume. Throttle discharge with valve.
   b. Heavy liquid or viscous liquid.
   c. Seal binding.
   d. Low voltage or low frequency.

6. **Seal leaks:**
   a. Improper assembly
   b. Worn or cracked seal faces.
   c. Abrasive material being pumped building up around seal causing faces to separate.
   d. Running dry.
   e. Liquid not compatible with elastomers or other parts of seal.

DISASSEMBLY

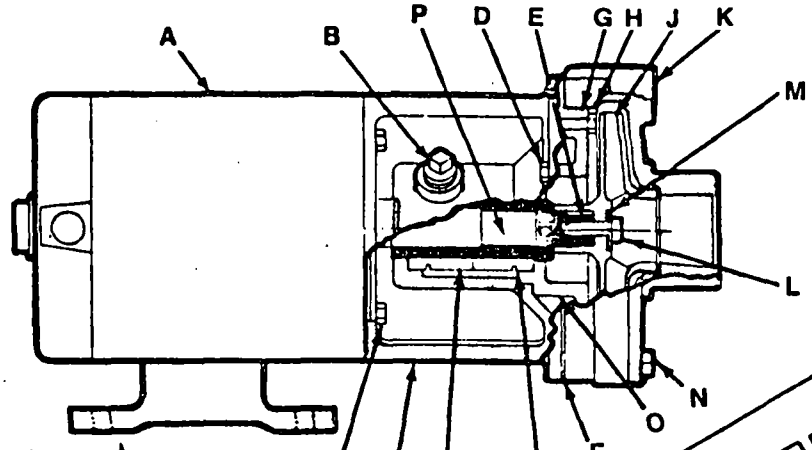
1. DISCONNECT POWER SOURCE TO MOTOR
2. DISCONNECT ELECTRICAL CONNECTIONS, tagging wires carefully to preserve correct rotation. Loosen pump base.
3. LOOSEN THE EIGHT 3/8"-16 BOLTS holding the volute to the motor bracket. Volute may be left in piping.
4. SLIDE PUMP AWAY FROM VOLUTE until impeller is exposed.
5. LOOSEN AND REMOVE THE THREE 1/4-20 SET SCREWS holding pump shaft to motor shaft.
6. REMOVE IMPELLER, SHAFT & SEAL as a unit. Pullers may be used or 2 large screwdrivers prying between back of impeller and bracket.
7. If seal seat did not come out with shaft, pry from cavity. We suggest motor bracket not be removed.
8. REMOVE SEAL FROM SHAFT by sliding toward motor end of shaft. May require force. Do not attempt to salvage.
9. INSPECT SHAFT FOR WEAR. Remove impeller and snap ring.
   Note: Shaft has internal keyway. Check and remove key if not already out.

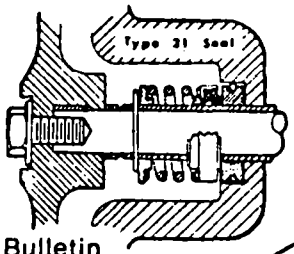
REASSEMBLY

1. CLEAN BRACKET AND SEAL CAVITY CAREFULLY.
2. INSTALL NEW SEAT INTO CAVITY. Lubricate seat cup and tap gently into place. Make sure seat is flat. Do not scratch surface. Use hollow wood dowel or plastic pipe.
3. INSTALL SHAFT, aligning motor keyway and internal shaft keyway. Place key on motor shaft. Assembly eased by placing unit on bench with shaft up.
4. LUBRICATE SHAFT AND/OR SEAL ID WITH LIGHT OIL. Slide new seal onto shaft until carbon rests on ceramic. Make sure carbon does not fall out of seal head, particularly if shaft is up.
5. Place spring and washer over shaft. Depress and hold while snap ring is installed in groove. Snap ring may be placed over shaft and slid down shaft to depress spring.
6. INSTALL IMPELLER KEY, IMPELLER AND IMPELLER LOCK BOLT WITH WASHER.
7. MOUNT VOLUTE WITH NEW GASKET. Note: Use care and tighten all bolts evenly. Rotate shaft frequently and check for rubbing. Several adjustments may be needed.
8. AFTER RECONNECTING ELECTRICAL CONNECTIONS as tagged, prime according to instructions. Make sure all air is removed.
9. JOG SWITCH to determine if rotation is correct. If not, reconnect.
10. REPRIME AND RETURN TO SERVICE.

PARTS LIST

A.	Motor with Base	Contact Factory
B.	1/2" Pipe Plug - 316SS - 2 req'd	0561
C.	Motor Bracket	0292
D.	Volute Bolts - (8 req'd)	0724
E.	Impeller Shaft Key	0305
F.	Volute Gasket	0301
G.	End Plate Gasket (optional)	0302
H.	End Plate Bolt (4 req'd)	0914
J.	Impeller (specify diameter)	
	A 10SS	0296
	B 15SS	0298
K.	Volute w/pipe plugs	
	A 10SS	0295-1
	B 15SS	0297-1
L.	Impeller Bolt	0303
M.	Impeller Washer	0304
N.	1/8" Pipe Plug - 316SS - (2 req'd)	0559
O.	Double Seal End Plate (optional)	0293
P.	Shaft w/Set Screws	
	T.21 Seal	0294-1
	T. 9 Seal	0294-2
R.	Seal with Seat	
	Viton	0122
	Teflon (T9)	0123
S.	Motor Bolts	0586
T.	Snap Ring	0372
U.	Motor Shaft Key (Not shown)	0135





Bulletin
#IN106

PRICE PUMP CO.
19672 - 8th Street East
P.O. Box Q
Sonoma, California 95476
Tel: (707) 938-8441
TWX 510-746-9260

DESCRIPTION

The Hersey Model MVR sizes 30-50-100 and 160 Magnetic Drive Turbine Meters with exclusive patented Retro Thrust® feature provides for longer life over a wider range of accuracies. At low flow rates the rotor's tungsten carbide thrust bearing floats against the sapphire bearing located in the meter casing. As flow rates increase the retro-thrust feature allows the rotor to float away from the sapphire. At high flow rates the rotor's stainless steel shaft floats against the upstream sapphire bearing, thereby minimizing wear and thus assuring extended operating life.

The Dura-Dri™ Register is permanently hermetically sealed between a glass dome and metal housing.

The register cover is constructed of cycolac plastic. The register is held in place by a polypropylene clamp band which allows for positioning the register in the most convenient reading position. Registers are available with center sweep hand, straight reading indicating cubic feet, U.S. gallons, cubic metres and litres.

The measuring chamber is composed of a noryl plastic inlet hub, polypropylene rotor and strainer on the MVR-30-50 and 100. The measuring chamber on the MVR-160 is composed of a noryl plastic inlet hub, polypropylene rotor and stainless steel ring strainer.

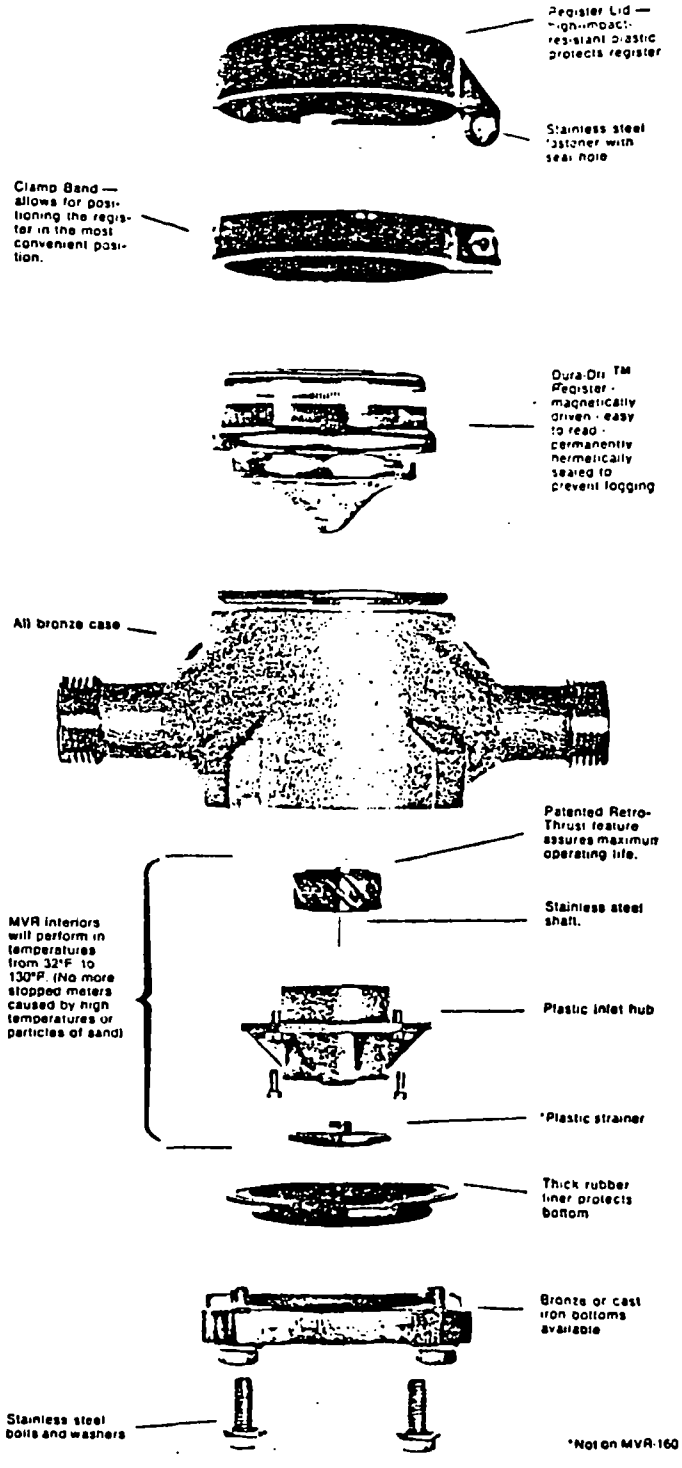
The strainer screws into the inlet hub. The MVR will operate at temperatures from 32° to 130°F. and will operate with particles of sand in the water. Outer cases are time-proven cast bronze.

Bottom plates are available in both bronze and enamel coated cast iron. Bronze only on the MVR-160.

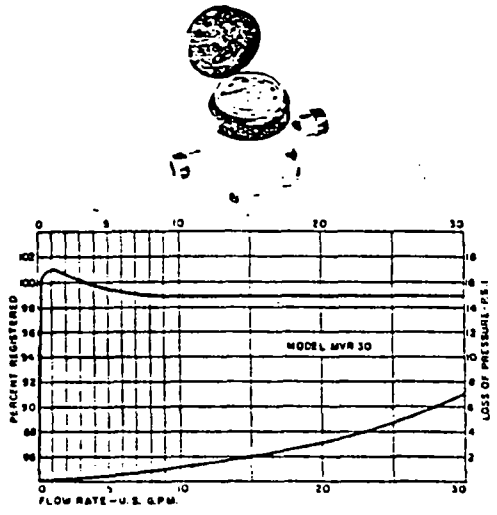
A full Buna-N rubber liner for the MVR 30-50 and 100 bottoms and an EPT liner for the MVR-160 are provided for corrosion protection.

Meter case is tapped to receive 4 stainless steel casing bolts and washers which secure the bottom to the meter housing.

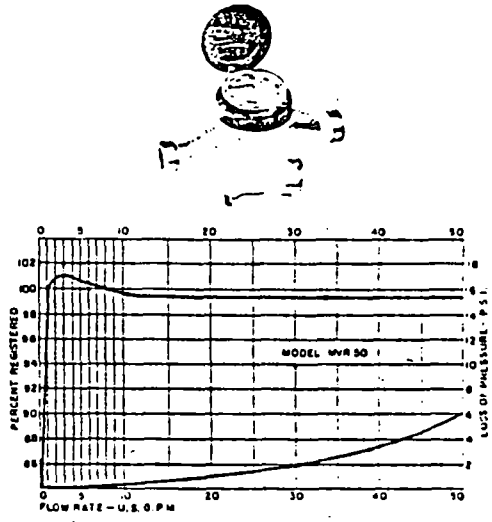
The Hersey MVR Magnetic Drive Turbine Meters are also available in compact models with varying spud sizes.



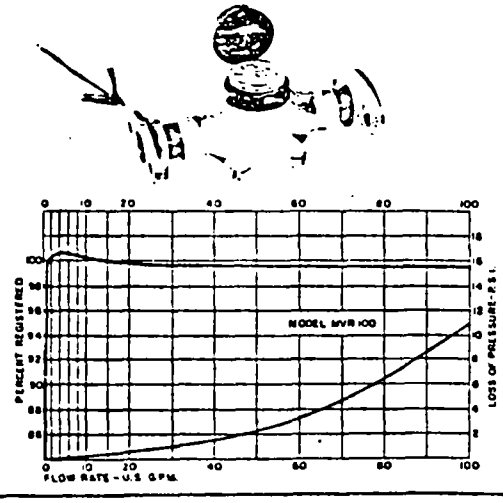
MVR-30



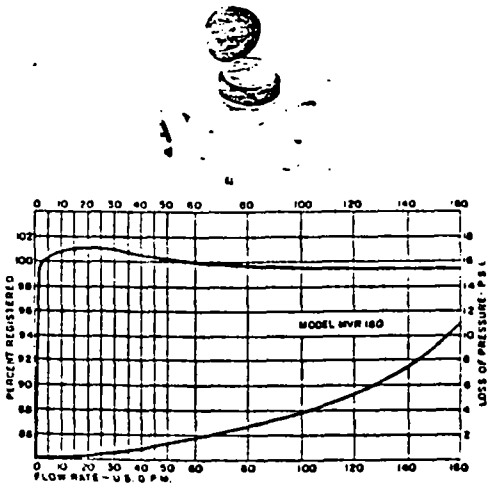
MVR-50



MVR-100



MVR-160



SPECIFICATIONS

Magnetic Drive Turbine Meters, sizes 30-50-100 and 160 shall have bronze outer cases. The register lid and clamp band shall be made of high-impact-resistant plastic to protect the register. The clamp band shall hold the register and lid in place by means of one stainless steel fastener and nut. Both the fastener and clamp band shall be drilled to receive sealing wire. The clamp band shall allow for positioning the register in the most convenient reading position.

The register shall be completely separated from the waterway and shall be available with center sweep hand, straight reading indicating cubic feet or U.S. gallons, cubic metres or litres. The register shall be permanently hermetically sealed between a glass dome and metal housing. The register shall be driven by a ceramic magnet.

The measuring chamber on MVR 30-50-100 shall be composed of a plastic inlet hub, rotor and strainer whereas the measuring chamber on the MVR 160 shall be composed of a plastic inlet hub and rotor and a stainless steel ring strainer. The chamber shall be held in place with (4) four stainless steel screws. It shall not be adversely affected by temperatures from 32°F. to 130°F. or by particles of sand. The meter shall incorporate a patented Retro-Thrust® design to assure maximum operating life. The rotor thrust bearings shall be sapphires and the bushings, graphitar.

The bottom plate shall be either bronze or enamel coated cast iron on the MVR 30-50-100, bronze only on the MVR 160. Both shall be protected with a thick rubber liner. The meter case shall be tapped to receive (4) four stainless steel bolts and washers which secure the bottom to the meter housing.

ELECTRICAL

BILL OF MATERIALS

Item	Description and Part No.	Reference Designator	Qty.
1	Fuse, dual element time delay. Bussman #FRS-R-15	Part of FX1	6 (3 spares)
2	Motor starter, Nema size 0 coil voltage: 24 VAC. Furnas #14 CF 32 AJ	MS1, MS2	2
3	Melting alloy, standard trip heater for Nema size 0 starter Furnas #H31 (7.70 - 8.54 amp)	MS1	3
4	Melting alloy, standard trip heater for Nema size 0 starter Furnas #H25 (4.01 - 4.50 amp)	MS2	3
5	Power monitor, 3 phase, 480 VAC. provides over voltage, under voltage and phase sequence protection. Time Mark #C269-480	KOE-2	1
6	Power monitor, 3 phase, 240 VAC provides over voltage, under voltage and phase sequence protection. Time Mark #B269-240	KOE-1	1
7	Two position maintained oiltight selector switch. Cutler-Hammer #10250T3011	SW1	1
8	Three position maintained oiltight selector switch. Cutler-Hammer #10250T1323	SW2	1
9	Transformer 480/240, 50 va, Jefferson #637268	T1	1
10	Transformer 480/24, 50 va, Jefferson #240201	T2	1
11	Terminal with 600 v clearance, Buchanan #525	TB1, TB2, TB3	32
12	Fuse/switch terminal block. Buchanan #352	Part of TB1	1
13	Fuse, dual element time delay. 1 amp 500 vol, 13/32" x 1-1/2" KTK 1 amp	Part of TB1	2 (1 spare)
14	Enclosure, Nema 12. 30" H x 24" W x 8" D Hoffman #A-302408LP	N/A	1

Item	Description and Part No.	Reference Designator	Qty.
15	Circuit breaker, 3 pole, 30 amp, 480 vac. Westinghouse #EHC3030	CB1	1
16	Line terminal lugs, Westinghouse #624B100G02	Part of CB1	1 pkg. of 3
17	Fuse block, 3 pole, 480 VAC (suitable for buss FRS series dual element time delay fuses) Taylor #60303	FX1	1
18	Mechanical interlock for Nema size 0 starters. Furnas #49CCF22H	Part of MS1 and MS2	1
19	Electrical auxiliary interlock for Nema size 0 starter with one N.C. contact	Part of MS1 and MS2	2
20	Contact block with pressure terminals, one N.O., one N.C. Cutler-Hammer #10250T1	Block 2, 3, 4, 5, 6 and 7 for SW1	6
21	Contact block with pressure terminals, two N.O. Cutler-Hammer #10250T2	Block 1 for SW1	2
22	Legend plate, blank Cutler-Hammer #10250TS36	Part of SW1	1
23	Legend plate, hand-off-auto. Cutler-Hammer #10250TS51	Part of SW2	1
24	End block for terminal strip. Buchanan #330	Part of TB1, TB2, and TB3	5
25	Subpanel 27"H x 21"W. Hoffman #A-30P24	N/A	1
26	Drip shield kit. Hoffman #A-DK24A	N/A	1

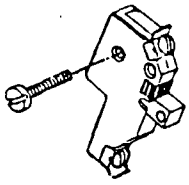
Innova 45

Supersedes Issue of May, 1975

INSTRUCTIONS

AUXILIARY ELECTRICAL INTERLOCK FOR STARTERS AND CONTACTORS

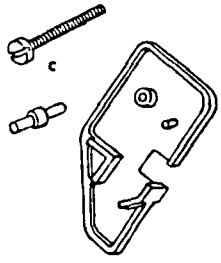
File No.	49-HD54682
Cat. No. or Class Series	14 & 40 OPEN & NEMA 1
Size	00-0-1-1P-1¼
Date	JANUARY, 1978



CONTENTS OF INTERLOCK KIT

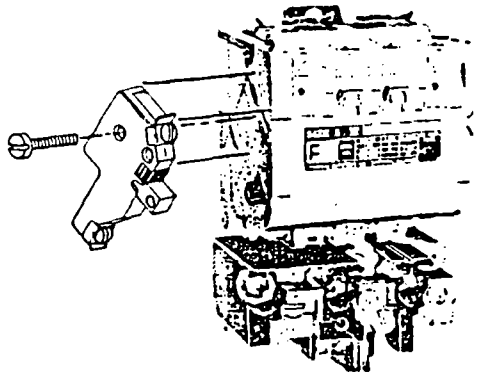
N.O. Kit No. 49D54682NO
E Normally Open Interlock
F Mounting Screw

N.C. Kit No. 49D54682NC
E Normally Closed Interlock
F Mounting Screw



CONTENTS OF TANDEM MOUNT KIT Kit No. 49L106889

A Switch Tie-Pin
B 2 Insulators
C Mounting Screw 6/32

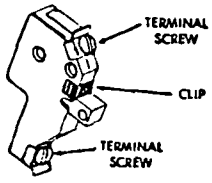


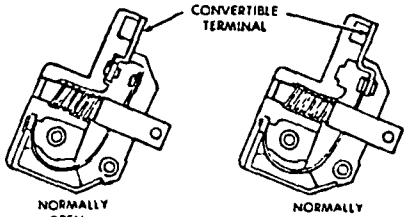
SINGLE INTERLOCK MOUNTING

Interlock may be mounted on either side of control. Hold interlock on side of the control as shown above and secure in place with mounting screw. Make sure the interlock lines up with the aligning notches on the control.

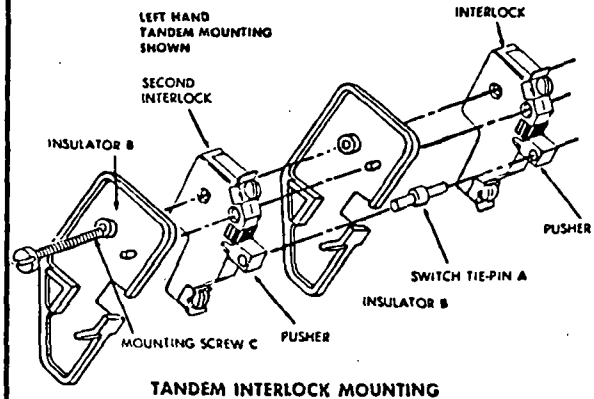
CONVERTING NORMALLY OPEN TO NORMALLY CLOSED

1. Remove both terminal screws and clip as shown. Remove interlock cover.





2. Turn convertible terminal to position desired for Normally Open or Normally Closed as shown above. Replace cover and terminal screws.



TANDEM INTERLOCK MOUNTING

NOTE: If interlock was previously mounted, the mounting screw will have to be removed.

1. Place Switch Tie-Pin A on Pusher of interlock.
2. Hold second interlock in place making sure Tie-Pin A and Insulators B are aligned. Secure with Mounting Screw C furnished in Tandem Mounting Kit.

NOTE: For right hand mounting insert mounting screw C from opposite side.

Innova 45

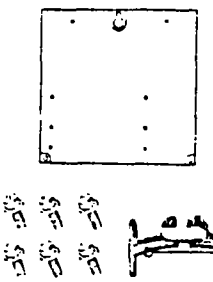
INSTRUCTIONS

HORIZONTAL MECHANICAL INTERLOCK FOR STARTERS AND CONTACTORS

KIT NO. 49CCF22HP & KIT NO. 49CCF22H

File No.
49-HCCF22H
Cat. No. or Class Series
Size
NOVEMBER, 1972

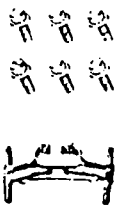
KIT 49CCF22HP



CONTENTS OF KIT

1 PANEL
6 SCREWS (10-32 x 3/8)
1 INTERLOCK ASSEMBLY

KIT 49CCF22H



CONTENTS OF KIT

6 SCREWS (10-32 x 3/8)
1 INTERLOCK ASSEMBLY

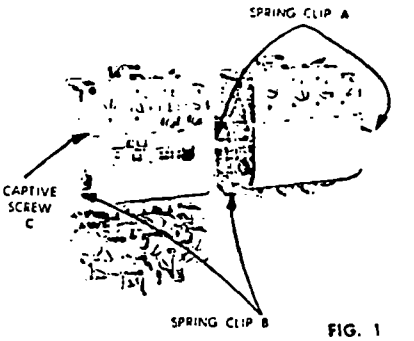


FIG. 1

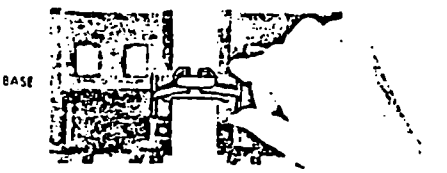


FIG. 2

1. Mount units (Starters or Contactors) on panel if supplied with kit or drill holes as required. See Fig. 4.
2. Remove arc box cover by pushing Spring Clip A up and Clip B down as shown in Fig. 1.
3. Remove arc box by loosening two captive screws C on arc box, Fig. 3.
   NOTE: If auxiliary interlocks are used between the units (maximum of two) they must be installed on the proper arc box before it is positioned on its base.
4. Hold interlock assembly in unit as shown in Fig. 2.
   CAUTION: Be sure interlock assembly is positioned as shown. Large metal side plate must be down and "T" shaped interlock parts must be up.
   - 4.1 Place left arc box on base. Fig. 3.
   - 4.2 Check for no binding.
   - 4.3 Tighten two captive screws C.
5. Assemble the right hand arc box and secure with the two captive screws C.
6. Check manually to be sure devices operate free and correctly. Only one unit should close at a time.
7. Replace arc box cover and return the spring clips A and B to their original positions.

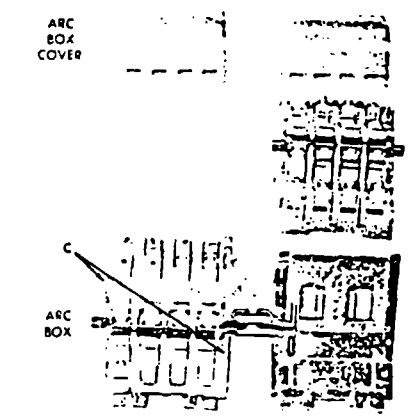


FIG. 3

WIRING

Wire the units as required for the installation. It is recommended that normally closed electrical interlock kits be used in addition to the mechanical interlock kit to conform to standard wiring practices and NEMA standards.

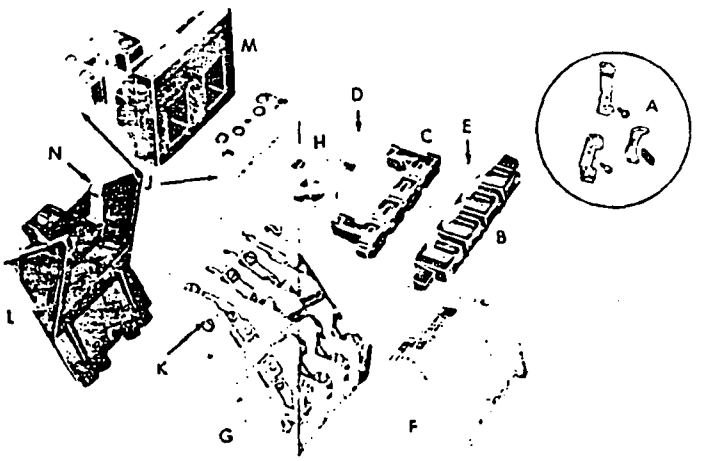
Innova-45

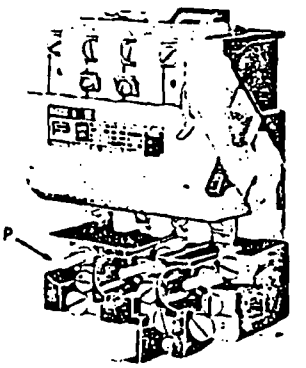
Supersedes Issue of May, 1981

REPLACEMENT PARTS

MAGNETIC CONTROLS

File No. 14-GCF
Cat. No. or Class Series 14BF, 14CF, 14DF, 14EF 40BF, 40CF, 40DF, 40EF
Size 00, 0, 1, 1P, & 1½
JUNE, 1982

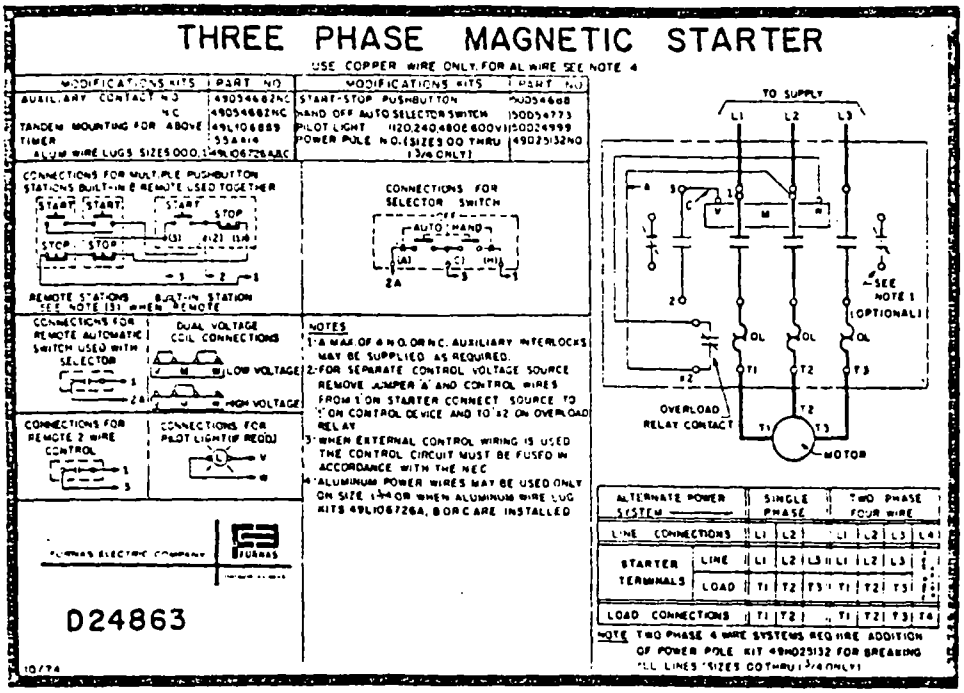




ITEM	PART NAME			PART NUMBER			
				14BF Size 00	14CF Size 0	14DF Size 1	14EF Size 1P & 1½
A	Contacts & Spring, One complete pole —		Power Pole	75BF14	75CF14	75DF14	75EF14
			Interlock Pole	75AF14	75AF14	75AF14	75AF14
B	Cross Arm (less contacts)			D54670 001	D54670 001	D54670 001	D54670 001
C	Cross Arm Base			D54873 001	D54873 001	D54873 001	D54873 001
D	Cross Arm Springs			D24826 001	D24826 001	D24826 001	D24826 001
E	Cross Arm Screw			D25013 001	D25013 001	D25013 001	D25013 001
F	Contact Board Cover			D73062 001	D73062 001	D73062 001	D73062 001
G	Contact Board (less contacts)			D73116 022	D73116 022	D73116 022	D73116022
H	Armature Spring Clip			D24817 001	D24817 001	D24817 001	D24817 001
J	Magnet and Armature			D25551 001	D25551 001	D25551 001	D25551 001
K	Contact Board Screw			D24827 001	D24827 001	D24827 001	D24827 001
L	Base			D74400 001	D74400 001	D74400 001	D74400 001
M	Coil 60 Hz. 110-120/208-240 Volts		50 Hz. 110 Volts	75D73070A	75D73070A	75D73070A	75D73070A
	208-240/440-480 Volts		220 Volts	75D73070C	75D73070C	75D73070C	75D73070C
	550-600 Volts		550 Volts	75D73070E	75D73070E	75D73070E	75D73070E
N	Coil Spring Clip			D24815001	D24815001	D24815001	D24815001
P	Overload Relays	Melting alloy (std.)	1 Pole	48DC11A2	48DC11A2	48DC11A2	48EC11A2
			3 Pole	48DC31A2	48DC31A2	48DC31A2	48EC31A2
		Standard Bimetal	1 Pole	48DC17AA2	48DC17AA2	48DC17AA2	48EC17AA2
			3 Pole	48DC37A2	48DC37A2	48DC37A2	48EC37A2
		Amb. Compensated Bimetal	1 Pole	48DC18AA2	48DC18AA2	48DC18AA2	48EC18AA2
			3 Pole	48DC38A2	48DC38A2	48DC38A2	48EC38A2

NOTE: When ordering replacement parts, give catalog number of control and part name and number.

Furnas Electric Company — Batavia, Illinois, U.S.A.



FURNAS ELECTRIC COMPANY, BATAVIA, ILLINOIS			
CATALOG NUMBER **14CF32AJ**			
MAGNET COIL RATING **24** VOLTS	**60** HERTZ		INSPECTED

H "Standard Trip" HEATER ELEMENTS FOR MELTING ALLOY RELAYS

Heaters shown in the table provide a maximum trip rating of 125% of the motor nameplate amperes, which is suitable for 40° C motors. For all other motors select heaters one code number lower than specified in the table, which give a maximum trip rating of approximately 115%.

The tripping current of any heater in a 40° C ambient is 25% greater than the lower value of motor amperes shown in table.

Starters do not provide protection from short circuits. A protective device should be provided in accordance with the N.E.C. (C.E.C. in Canada) and not exceed the values shown in the table.

PROTECTIVE DEVICE:

*Fuse or inverse time circuit breaker. Fuses above 600 amps are Class "L".

†Instantaneous trip circuit breaker.

Full Load Mo. Amps. Min.	Max.	Heater Code No.	Max. Rat. of Prot. Device *	†
.35	.39	H1	2	
.40	.44	H2	2	
.45	.50	H3	2	
.51	.55	H4	2	
.56	.61	H5	2	
.62	.68	H6	3	
.69	.74	H7	3	
.75	.82	H8	3	
.83	.92	H9	3	
.93	1.02	H10	4	
1.03	1.13	H11	4	
1.14	1.29	H12	4	
1.30	1.45	H13	5	
1.46	1.57	H14	5	
1.58	1.74	H15	6	
1.75	1.92	H16	6	
1.93	2.18	H17	8	
2.19	2.34	H18	8	
2.35	2.62	H20	10	
2.63	2.97	H21	10	
2.98	3.25	H22	12	
3.26	3.60	H23	12	
3.61	4.00	H24	15	
4.01	4.50	H25	15	
4.51	5.10	H26	20	
5.11	6.32	H28	25	
6.33	6.81	H29	25	
6.82	7.69	H30	30	
7.70	8.54	H31	30	
8.55	9.54	H32	35	
9.55	10.7	H33	40	
10.8	12.1	H34	40	
12.2	12.7	H35	45	
12.8	14.0	H36	45	
14.1	14.9	H37	60	
15.0	16.9	H38	60	
17.0	18.1	H39	60	

1HW182 D25560-2AS

VOLTAGE MONITORS CORPORATION

3-PHASE POWER MONITOR

MODEL 269

INSTALLATION INSTRUCTIONS

!CAUTION!

POTENTIALLY HAZARDOUS VOLTAGES ARE PRESENT AT THE TERMINALS OF THE MODEL 269. ALL ELECTRICAL POWER SHOULD BE REMOVED WHEN CONNECTING OR DISCONNECTING WIRING OR MAKING ADJUSTMENTS TO THE UNIT. THE UNIT SHOULD BE INSTALLED AND SERVICED BY QUALIFIED PERSONNEL.

INSTALLATION:

THE THREE PHASE WIRING SHOULD BE CONNECTED TO THE TERMINALS MARKED A, B AND C. THE CONTROL WIRING WILL BE CONNECTED AT THE OPPOSITE END OF THE UNIT TO TH- TERMINALS WITH THE CONTACT MARKINGS. THE MARKINGS SHOWN O' THE UNIT ARE THE FAILED CONDITION OF THE CONTACTS. IF T-E CONTACTS DO NOT TRANSFER WHEN POWER IS APPLIED (INDICATOR LITES OFF), CHECK THAT ALL THREE PHASES ARE PRESENT AND OF THE CORRECT VOLTAGE. IF ALL PHASES ARE CORRECT, ROTATE THE "UNDER VOLTS" ADJUSTMENT COUNTER-CLOCKWISE AND THE "OVER VOLTS" ADJUSTMENT CLOCKWISE. IF THE CONTACTS STILL DO NOT TRANSFER, REMOVE POWER FROM THE UNIT. REVERSE TWO OF THE THREE PHASE WIRES THEN REAPPLY POWER. THE CONTACTS SHOULD THEN TRANSFER TO THE OPERATING CONDITION (INDICATOR LITES OFF).

ADJUSTMENT:

BOTH THE UNDER AND OVER VOLTS ADJUSTMENTS ARE SCALED AT FIVE VOLT INCREMENTS. SET EACH ADJUSTMENT TO THE DESIRED VOLTAGE TRIP LEVEL, THEN SET THE DELAY SECONDS ADJUSTMENT TO THE MINIMUM TIME DELAY NECESSARY TO PREVENT NUISANCE TRIPPING.

11440 E. PINE (918) 438-1220 TULSA, OK 74116

87A00087

APPENDIX B

Laboratory Analytical Data

CORPORATION

PAGE 1 Analytical Serv REPORT LAB # 85-07-015
RECEIVED: 07/02/85 03/20/86 12:00:56

REPORT TO: Radian
Bl. 4
Austin

ATTEN: Robt. Wallace/Will Boettner

CLIENT: MAXIN SAMPLES: 3
COMPANY: Maxin Eng.
FACILITY:

WORK ID: No. End of Foundation Excav.
TAKEN:
TRANS: Fed Ex. 436499766
TYPE: Oily Water
P. O. #: 229-025-01-20
INV. #: 6108

PREPARED BY: Radian Analytical Services
8501 MoPac Blvd.
P. O. Box 9948
Austin, Texas 78766

ATTEN:
PHONE: (512) 454-4797

CERTIFIED BY

CONTACT: GRIMSHAW

Duplicate of report of 07/11/85.

Footnotes and Comments

* Indicates a value less than 5 times the detection limit. Potential error for such low values ranges between 50 and 100%.

@ Indicates that spike recovery for this analysis on the specific matrix was not within acceptable limits indicating an interferent present.

SAMPLE IDENTIFICATION

03 Trip Blank VOA
11 #6
12 #7

Analytical Serv TEST CODES and NAMES used on this report

EX 625	Extraction only - 625 BN/A
IFB BS	BNA Screen by IFB method
M625 A	Method 625 Acid Compounds
M625 B	Method 625 Base/Neutrals
MSNS S	GCMS Characterization-ABN
MSNS V	GCMS Characterization-VOA
MS 624	EPA Method 624/GC-MS

TEST CODE default units	Sample 11 (entered units)
EX_625 date complete	07/02/85
IFB_BS date complete	07/01/85

CORPORATION

PAGE 3 Analytical Serv REPORT LAB # 85-07-015
RECEIVED: 07/02/85 Results by Sample

SAMPLE ID #6 FRACTION 11A TEST CODE M625 A NAME Method 625 Acid Compounds
Date & Time Collected 07/01/85 Category

DATA FILE 2CU07015C11 DATE EXTRACTED 07/02/85 ANALYST WA VERIFIED BY LAK
CONC. FACTOR 11 DATE INJECTED 07/05/85 INSTRUMENT COMPOUNDS DETECTED 0

NPDES	SCAN	EPA	COMPOUND	RESULT	NPDES	SCAN	EPA	COMPOUND	RESULT
11A		21A	2,4,6-trichlorophenol	ND	7A		58A	4-nitrophenol	ND
8A		22A	4-chloro-3-methylphenol	ND	5A		59A	2,4-dinitrophenol	ND
1A		24A	2-chlorophenol	ND	4A		60A	2-methyl-4,6-dinitrophenol	ND
2A		31A	2,4-dichlorophenol	ND	9A		64A	pentachlorophenol	ND
3A		34A	2,4-dimethylphenol	ND	10A		65A	phenol	ND
6A		57A	2-nitrophenol	ND					

SURROGATE RECOVERIES

SCAN	CODE	COMPOUND	RESULT
448	AS1	d5-phenol	33%
340	AS2	2-fluorophenol	26%
1075	AS3	2,4,6-tribromophenol	100%
	AS4	d3-phenol	

NOTES AND DEFINITIONS FOR THIS REPORT.
SCAN = scan number or retention time on chromatogram.
All results reported in ug/l unless otherwise specified.

SAMPLE ID #6 FRACTION 11A TEST CODE M625 A NAME Method 625 Acid Compounds
Date & Time Collected 07/01/85 Category

ND = not detected at EPA detection limit method 625, (Federal Register, 11/26/84).
BL = detected in reagent blank; background subtraction not performed.
J = estimated value; less than method detection limit.
CONC. FACTOR: indicates dilution of sample if greater than one (1). Minimum detection limits should be multiplied by conc. factor.

SAMPLE ID #6 FRACTION 11A TEST CODE M625 B NAME Method 625 Base/Neutrals
Date & Time Collected 07/01/85 Category

DATA FILE 2CU07015C11 DATE EXTRACTED 07/02/85 ANALYST WA VERIFIED BY LAK
CONC. FACTOR 11 DATE INJECTED 07/05/85 INSTRUMENT COMPOUNDS DETECTED 14

NPDES	SCAN	EPA	COMPOUND	RESULT	NPDES	SCAN	EPA	COMPOUND	RESULT
1B	955	1B	acenaphthene	1200	41B		61B	N-nitrosodimethylamine	ND
4B		5B	benzidine	ND	43B		62B	N-nitrosodiphenylamine	ND
46B		8B	1,2,4-trichlorobenzene	ND	42B		63B	N-nitrosodi-n-propylamine	ND
33B		9B	hexachlorobenzene	ND	13B		66B	bis(2-ethylhexyl)phthalate	ND
36B		12B	hexachloroethane	ND	15B		67B	butyl benzyl phthalate	ND
11B		18B	bis(2-chloroethyl)ether	ND	26B		68B	di-butyl phthalate	ND
16B		20B	2-chloronaphthalene	ND	29B		69B	di-n-octyl phthalate	ND
20B		25B	1,2-dichlorobenzene	ND	24B		70B	diethyl phthalate	ND
21B		26B	1,3-dichlorobenzene	ND	25B		71B	dimethyl phthalate	ND
22B		27B	1,4-dichlorobenzene	ND	5B	1617	72B	benzo(a)anthracene A	720
23B		28B	3,3'dichlorobenzidine	ND	6B	1934	73B	benzo(a)pyrene	770
27B		35B	2,4-dinitrotoluene	ND	7B		74B	benzo(b)fluoranthene *	ND
28B		36B	2,6-dinitrotoluene	ND	9B	1848	75B	benzo(k)fluoranthene *	850
29B		37B	1,2-diphenylhydrazine	ND	18B	1623	76B	chrysene A	790
31B	1380	39B	fluoranthene	1700	2B	925	77B	acenaphthylene	1000
17B		40B	4-chlorophenyl phenyl ether	ND	3B	1194	78B	anthracene B	1100

SAMPLE ID #6 FRACTION 11A TEST CODE M625 B NAME Method 625 Base/Neutrals
Date & Time Collected 07/01/85 Category

14B		41B	4-bromophenyl phenyl ether	ND	8B	2483	79B	benzo(ghi)perylene	200
12B		42B	bis(2-chloroisopropyl)ether	ND	32B	1035	80B	fluorene	1400
10B		43B	bis(2-chloroethoxy)methane	ND	44B	1188	81B	phenanthrene B	2400
34B		52B	hexachlorobutadiene	ND	19B		82B	dibenzo(a,h)anthracene	ND
35B		53B	hexachlorocyclopentadiene	ND	37B	2353	83B	indeno(1,2,3-cd)pyrene	220
38B		54B	isophorone	ND	45B	1417	84B	pyrene	1500
39B	678	55B	naphthalene	8000					
40B		56B	nitrobenzene	ND					

SURROGATE RECOVERIES

SCAN	CODE	RESULT	
571	BS1	d5-nitrobenzene	100%
845	BS2	2-fluorobiphenyl	55%
1446	BS3	d14-terphenyl	73%
	BS4	d10-biphenyl	

NOTES AND DEFINITIONS FOR THIS REPORT.

SCAN = scan number or retention time on chromatogram.
All results reported in ug/l unless otherwise specified.
ND = not detected at EPA detection limit method 625, (Federal Register, 10/26/84).
* = benzo(b)fluoranthene and benzo(k)fluoranthene co-elute.
A = benzo(a)anthracene and chrysene co-elute in high concentrations.

SAMPLE ID #6 FRACTION 11A TEST CODE M625 B NAME Method 625 Base/Neutrals
Date & Time Collected 07/01/85 Category

B = anthracene and phenanthrene co-elute in high concentrations.
BL = detected in reagent blank; background subtraction not performed.
J = estimated value; less than method detection limit.
CONC. FACTOR: indicates dilution of sample if greater than one (1). Minimum detection limits should be multiplied by conc. factor.

SAMPLE ID #6 FRACTION 11A TEST CODE MSNS S NAME GCMS Characterization-ABN
Date & Time Collected 07/01/85 Category

CHRO # 2CU07015C1 VERIFIED BY LAK
SAMPLE SIZE 920 ml DATE ANALYZED 07/05/85 UNITS ug/l

SCAN	COMPOUND	RESULT	CONF LEVEL	REF CMPD
785	2-methylnaphthalene	3200		
980	dibenzofuran	260		
523	benzene, 1-propenyl-	4500		
532	1h-indene	8100		
641	cyclopropa[a]indene, 1, 1a, 6, 6a-tetra hydro	870		
648	cyclopropa[a]indene, 1, 1a, 6, 6a-tetra hydro	1000		
802	naphthalene, 1-methyl-	3700		
859	1, 1'-biphenyl	1800		
884	Naphthalene, 2, 7-dimethyl	1600		
897	naphthalene, 2, 3-dimethyl	2400		
1069	1h-phenalene	660		
1124	9H-fluorene, 4-methyl-	550		
1167	dibenzothiophene	510		
1271	phenanthrene, 3-methyl-	1300		

SAMPLE ID #6 FRACTION 11B TEST CODE MSNS S NAME GCMS Characterization-ABN
Date & Time Collected 07/01/85 Category

CHRO # 2CU07015C1 VERIFIED BY LAK
SAMPLE SIZE 920 ml DATE ANALYZED 07/05/85 UNITS ug/l

SCAN	COMPOUND	RESULT	CONF LEVEL	REF CMPD
1285	phenanthrene, 4-methyl	1700		
1266	phenanthrene, 3-methyl	1200		
1314	naphthalene, 2-phenyl	840		

SAMPLE ID #7 FRACTION 12A TEST CODE MSNS V NAME GCMS Characterization-VOA
Date & Time Collected 07/01/85 Category

CHRO # 4CQ07015V2 VERIFIED BY LAK
SAMPLE SIZE 50 ul DATE ANALYZED 07/02/85 UNITS ug/l

SCAN	COMPOUND	RESULT	CONF LEVEL	REF CMPD
483	total xylenes	2200		
526	2,3-dihydro-1h-indene	2500		

CORPORATION

PAGE 11 Analytical Serv REPORT LAB # 85-07-015
RECEIVED: 07/02/85 Results by Sample

SAMPLE ID #7 FRACTION 12A TEST CODE MS 624 NAME EPA Method 624/GC-MS
Date & Time Collected 07/01/85 Category

DATA FILE 4CU07015V12 DATE INJECTED 07/02/85 ANALYST MM VERIFIED BY LAK
CONC. FACTOR 100 INSTRUMENT f4 COMPOUNDS DETECTED 3

NPDES	SCAN	EPA	COMPOUND	RESULT	NPDES	SCAN	EPA	COMPOUND	RESULT
3V	251	4V	benzene	1500	17V		32V	1,2-dichloropropane	ND
6V		6V	carbon tetrachloride	ND	18V		33V	cis-1,3-dichloropropylene	ND
7V		7V	chlorobenzene	ND	18V		33V	trans-1,3-dichloropropylene	ND
15V		10V	1,2-dichloroethane	ND	19V	425	38V	ethylbenzene	2000
27V		11V	1,1,1-trichloroethane	ND	22V		44V	methylene chloride	ND
14V		13V	1,1-dichloroethane	ND	21V		45V	methyl chloride	ND
28V		14V	1,1,2-trichloroethane	ND	20V		46V	methyl bromide	ND
23V		15V	1,1,2,2-tetrachloroethane	ND	5V		47V	bromoform	ND
9V		16V	chloroethane	ND	12V		48V	dichlorobromomethane	ND
10V		19V	2-chloroethylvinyl ether	ND	30V		49V	trichlorofluoromethane	ND
11V		23V	chloroform	ND	8V		51V	chlorodibromomethane	ND
16V		29V	1,1-dichloroethylene	ND	24V		85V	tetrachloroethylene	ND
26V		30V	1,2-trans-dichloroethylene	ND	25V	373	86V	toluene	3000
					29V		87V	trichloroethylene	ND
					31V		88V	vinyl chloride	ND

SAMPLE ID #7 FRACTION 12A TEST CODE MS 624 NAME EPA Method 624/GC-MS
Date & Time Collected 07/01/85 Category

SURROGATE RECOVERIES

SCAN	CODE	COMPOUND	RESULT
145	VS1	d4-1,2-dichloroethane	90%
370	VS2	d8-toluene	95%
456	VS3	bromofluorobenzene	91%

NOTES AND DEFINITIONS FOR THIS REPORT.
SCAN = scan number or retention time on chromatogram.
All results reported in ug/l unless otherwise specified.
ND = not detected at EPA detection limit method 624, (Federal Register, 10/26/84).
BL = detected in reagent blank; background subtraction not performed.
J = estimated value; less than method detection limit.
CONC. FACTOR: indicates dilution of sample if greater than one (1). Minimum detection limits should be multiplied by conc. factor.

FRACTION AND TEST CODES FOR WORK NOT REPORTED ELSEWHERE

03B : DUP624

CORPORATION

PAGE 1 Analytical Serv REPORT LAB # 85-10-058

RECEIVED: 10/10/85 03/20/86 12:03:23

REPORT TO: Radian
Bl. 4
Austin

ATTEN: Robert Wallace

CLIENT: LINCOLN SAMPLES: 3
COMPANY: Lincoln Properties
FACILITY: Congress Av.

WORK ID: pre- and post-treatment
TAKEN: BJH
TRANS: BJH
TYPE:
P. O. #: 229-025-05-20
INV. #: 6724

PREPARED BY: Radian Analytical Services
8501 MoPac Blvd.
P.O. Box 9948
Austin, Texas 78766

ATTEN:
PHONE: (512) 454-4797

CERTIFIED BY

CONTACT: GRIMSHAW

**Sample was yellow in color.
B-Compound detected in Reagent Blank at less than method MDL; background correction not performed.
NA-Not applicable.

Duplicate of report of 10/31/85.

Footnotes and Comments

* Indicates a value less than 5 times the detection limit. Potential error for such low values ranges between 50 and 100%.

@ Indicates that spike recovery for this analysis on the specific matrix was not within acceptable limits indicating an interferent present.

SAMPLE IDENTIFICATION

01	Con-1
02	Con-2
03	Con-3

Analytical Serv TEST CODES and NAMES used on this report

AG E	Silver, ICPES
AS HA	Arsenic Hydride
BA E	Barium, ICPES
BOD5	Biological Oxygen Demand
B E	Boron, ICPES
CD E	Cadmium, ICPES
CH2O	Formaldehyde
CL IC	Chloride IC
COD A	Chemical Oxygen Demand
CR E	Chromium, ICPES
CU E	Copper, ICPES
EX 625	Extraction only - 625 BN/A
HG CA	Mercury, Cold Vapor
M625 A	Method 625 Acid Compounds
M625 B	Method 625 Base/Neutrals
MN E	Manganese, ICPES
MS 624	EPA Method 624/GC-MS
NI E	Nickel, ICPES
OPO4 A	Orthophosphate
PB GA	Lead, low level
PH A	pH
SE HA	Selenium Hydride
SO4 IC	Sulfate IC
ZN E	Zinc, ICPES

TEST CODE default units	Sample 01 (entered units)	Sample 02 (entered units)	Sample 03 (entered units)
AG_E ug/ml	0.004*	0.003*	
AS_HA ug/ml	0.007*	0.007*	
BA_E ug/ml	0.18	0.084	
BOD5 mg/L	4	1	
B_E ug/ml	1.1	0.23*	
CD_E ug/ml	<0.002	<0.002	
CH2O mg/L	0.2	0.2**	
CL_IC mg/L	72	77	
COD_A mg/L	110	7	
CR_E ug/ml	0.013*	0.010*	
CU_E ug/ml	0.008	0.001*	
EX_625 date complete	10/15/85	10/15/85	10/15/85
HG_CA ug/ml	<0.0002	<0.0002	
MN_E ug/ml	0.12	0.016	

NI_E ug/ml	0.017	0.003*
OPO4_A mg/L as P	1.5 mg/L	0.18 mg/L
PB_GA ug/ml	<0.002	<0.002
PH_A pH units	8.16	8.25
SE_HA ug/ml	<0.002	<0.002
SO4_IC mg/L	740	345
ZN_E ug/ml	0.003*	<0.003

CORPORATION

PAGE 4 Analytical Serv REPORT LAB # 85-10-058
RECEIVED: 10/10/85 Results by Sample

SAMPLE ID Con-1 FRACTION 01G TEST CODE M625 A NAME Method 625 Acid Compounds
Date & Time Collected 10/03/85 Category

DATA FILE 2CU10058C01 DATE EXTRACTED 10/15/85 ANALYST SF VERIFIED BY LAK
CONC. FACTOR 1 DATE INJECTED 10/23/85 INSTRUMENT 32 COMPOUNDS DETECTED 0

NPDES	SCAN	EPA	COMPOUND	RESULT	NPDES	SCAN	EPA	COMPOUND	RESULT
11A		21A	2,4,6-trichlorophenol	ND	7A		58A	4-nitrophenol	ND
8A		22A	4-chloro-3-methylphenol	ND	5A		59A	2,4-dinitrophenol	ND
1A		24A	2-chlorophenol	ND	4A		60A	2-methyl-4,6-dinitrophenol	ND
2A		31A	2,4-dichlorophenol	ND	9A		64A	pentachlorophenol	ND
3A		34A	2,4-dimethylphenol	ND	10A		65A	phenol	ND
6A		57A	2-nitrophenol	ND					

SURROGATE RECOVERIES

SCAN	CODE	COMPOUND	RESULT
446	AS1	d5-phenol	84
333	AS2	2-fluorophenol	42
1065	AS3	2,4,6-tribromophenol	82
	AS4	d3-phenol	na

NOTES AND DEFINITIONS FOR THIS REPORT.
SCAN = scan number or retention time on chromatogram.
All results reported in ug/l unless otherwise specified.

SAMPLE ID Con-1 FRACTION 01G TEST CODE M625 A NAME Method 625 Acid Compounds
Date & Time Collected 10/03/85 Category

ND = not detected at EPA detection limit method 625, (Federal Register, 11/26/84).
BL = detected in reagent blank; background subtraction not performed.
J = estimated value; less than method detection limit.
CONC. FACTOR: indicates dilution of sample if greater than one (1). Minimum detection limits should be multiplied by conc. factor.

CORPORATION

PAGE 6 Analytical Serv REPORT LAB # 85-10-058
RECEIVED: 10/10/85 Results by Sample

SAMPLE ID Con-1 FRACTION 01G TEST CODE M625 B NAME Method 625 Base/Neutrals
Date & Time Collected 10/03/85 Category

DATA FILE 2CU10058C01 DATE EXTRACTED 10/15/85 ANALYST SF VERIFIED BY LAK
CONC. FACTOR 1 DATE INJECTED 10/23/85 INSTRUMENT 32 COMPOUNDS DETECTED 8

NPDES	SCAN	EPA	COMPOUND	RESULT	NPDES	SCAN	EPA	COMPOUND	RESULT
1B	946	1B	acenaphthene	7	41B		61B	N-nitrosodimethylamine	ND
4B		5B	benzidine	ND	43B		62B	N-nitrosodiphenylamine	ND
46B		8B	1,2,4-trichlorobenzene	ND	42B		63B	N-nitrosodi-n-propylamine	ND
33B		9B	hexachlorobenzene	ND	13B	1611	66B	bis(2-ethylhexyl)phthalate	7
36B		12B	hexachloroethane	ND	15B		67B	butyl benzyl phthalate	ND
11B		18B	bis(2-chloroethyl)ether	ND	26B	1276	68B	di-butyl phthalate	10
16B		20B	2-chloronaphthalene	ND	29B		69B	di-n-octyl phthalate	ND
20B		25B	1,2-dichlorobenzene	ND	24B		70B	diethyl phthalate	ND
21B		26B	1,3-dichlorobenzene	ND	25B		71B	dimethyl phthalate	ND
22B		27B	1,4-dichlorobenzene	ND	5B		72B	benzo(a)anthracene A	ND
23B		28B	3,3'dichlorobenzidine	ND	6B		73B	benzo(a)pyrene	ND
27B		35B	2,4-dinitrotoluene	ND	7B		74B	benzo(b)fluoranthene *	ND
28B		36B	2,6-dinitrotoluene	ND	9B		75B	benzo(k)fluoranthene *	ND
29B		37B	1,2-diphenylhydrazine	ND	18B		76B	chrysene A	ND
31B	1366	39B	fluoranthene	5	2B		77B	acenaphthylene	ND
17B		40B	4-chlorophenyl phenyl ether	ND	3B	1183	78B	anthracene B	3

SAMPLE ID Con-1 FRACTION 01G TEST CODE M625 B NAME Method 625 Base/Neutrals
Date & Time Collected 10/03/85 Category

14B		41B	4-bromophenyl phenyl ether	ND	8B		79B	benzo(ghi)perylene	ND
12B		42B	bis(2-chloroisopropyl)ether	ND	32B	1025	80B	fluorene	3
10B		43B	bis(2-chloroethoxy)methane	ND	44B	1175	81B	phenanthrene B	8
34B		52B	hexachlorobutadiene	ND	19B		82B	dibenzo(a,h)anthracene	ND
35B		53B	hexachlorocyclopentadiene	ND	37B		83B	indeno(1,2,3-cd)pyrene	ND
38B		54B	isophorone	ND	45B		84B	pyrene	ND
39B	673	55B	naphthalene	3					
40B		56B	nitrobenzene	ND					

SURROGATE RECOVERIES

SCAN	CODE	RESULT	
566	BS1	d5-nitrobenzene	84
838	BS2	2-fluorobiphenyl	65
1429	BS3	d14-terphenyl	37
	BS4	d10-biphenyl	na

NOTES AND DEFINITIONS FOR THIS REPORT.

SCAN = scan number or retention time on chromatogram.
All results reported in ug/l unless otherwise specified.
ND = not detected at EPA detection limit method 625, (Federal Register, 10/26/84).
* = benzo(b)fluoranthene and benzo(k)fluoranthene co-elute.
A = benzo(a)anthracene and chrysene co-elute in high concentrations.

SAMPLE ID Con-1 FRACTION 01G TEST CODE M625 B NAME Method 625 Base/Neutrals
Date & Time Collected 10/03/85 Category

B = anthracene and phenanthrene co-elute in high concentrations.
BL = detected in reagent blank; background subtraction not performed.
J = estimated value; less than method detection limit.
CONC. FACTOR: indicates dilution of sample if greater than one (1). Minimum detection limits should be multiplied by conc. factor.

CORPORATION

PAGE 9 Analytical Serv REPORT LAB # 85-10-058
RECEIVED: 10/10/85 Results by Sample

SAMPLE ID Con-1 FRACTION 01E TEST CODE MS 624 NAME EPA Method 624/GC-MS
Date & Time Collected 10/03/85 Category

DATA FILE 4CU10058V01 DATE INJECTED 10/16/85 ANALYST MM VERIFIED BY LAK
CONC. FACTOR 1 INSTRUMENT 3400 COMPOUNDS DETECTED 1

NPDES	SCAN	EPA	COMPOUND	RESULT
3V		4V	benzene	ND
6V		6V	carbon tetrachloride	ND
7V		7V	chlorobenzene	ND
15V		10V	1,2-dichloroethane	ND
27V		11V	1,1,1-trichloroethane	ND
14V		13V	1,1-dichloroethane	ND
28V		14V	1,1,2-trichloroethane	ND
23V		15V	1,1,2,2-tetrachloroethane	ND
9V		16V	chloroethane	ND
10V		19V	2-chloroethylvinyl ether	ND
11V		23V	chloroform	ND
16V		29V	1,1-dichloroethylene	ND
26V		30V	1,2-trans-dichloroethylene	ND
17V		32V	1,2-dichloropropane	ND
18V		33V	cis-1,3-dichloropropylene	ND
18V		33V	trans-1,3-dichloropropylene	ND
19V		38V	ethylbenzene	ND
22V	106	44V	methylene chloride	10 B
21V		45V	methyl chloride	ND
20V		46V	methyl bromide	ND
5V		47V	bromoform	ND
12V		48V	dichlorobromomethane	ND
30V		49V	trichlorofluoromethane	ND
8V		51V	chlorodibromomethane	ND
24V		85V	tetrachloroethylene	ND
25V		86V	toluene	ND
29V		87V	trichloroethylene	ND
31V		88V	vinyl chloride	ND

SAMPLE ID Con-1 FRACTION 01E TEST CODE MS 624 NAME EPA Method 624/GC-MS
Date & Time Collected 10/03/85 Category

SURROGATE RECOVERIES

SCAN	CODE	COMPOUND	RESULT
199	VS1	d4-1,2-dichloroethane	82
385	VS2	d8-toluene	100
473	VS3	bromofluorobenzene	56

NOTES AND DEFINITIONS FOR THIS REPORT.
SCAN = scan number or retention time on chromatogram.
All results reported in ug/l unless otherwise specified.
ND = not detected at EPA detection limit method 624, (Federal Register, 10/26/84).
BL = detected in reagent blank; background subtraction not performed.
J = estimated value; less than method detection limit.
CONC. FACTOR: indicates dilution of sample if greater than one (1). Minimum detection limits should be multiplied by conc. factor.

CORPORATION

PAGE 11 Analytical Serv REPORT LAB # 85-10-058
RECEIVED: 10/10/85 Results by Sample

SAMPLE ID Con-2 FRACTION 02G TEST CODE M625 B NAME Method 625 Base/Neutrals
Date & Time Collected 10/07/85 Category

DATA FILE 2CU10058C02 DATE EXTRACTED 10/15/85 ANALYST WJL VERIFIED BY LAK
CONC. FACTOR 1 DATE INJECTED 10/22/85 INSTRUMENT 32 COMPOUNDS DETECTED 2

NPDES	SCAN	EPA	COMPOUND	RESULT	NPDES	SCAN	EPA	COMPOUND	RESULT
1B		1B	acenaphthene	ND	41B		61B	N-nitrosodimethylamine	ND
4B		5B	benzidine	ND	43B		62B	N-nitrosodiphenylamine	ND
46B		8B	1,2,4-trichlorobenzene	ND	42B		63B	N-nitrosodi-n-propylamine	ND
33B		9B	hexachlorobenzene	ND	13B	1615	66B	bis(2-ethylhexyl)phthalate	6
36B		12B	hexachloroethane	ND	15B		67B	butyl benzyl phthalate	ND
11B		18B	bis(2-chloroethyl)ether	ND	26B	1279	68B	di-butyl phthalate	14
16B		20B	2-chloronaphthalene	ND	29B		69B	di-n-octyl phthalate	ND
20B		25B	1,2-dichlorobenzene	ND	24B		70B	diethyl phthalate	ND
21B		26B	1,3-dichlorobenzene	ND	25B		71B	dimethyl phthalate	ND
22B		27B	1,4-dichlorobenzene	ND	5B		72B	benzo(a)anthracene A	ND
23B		28B	3,3'dichlorobenzidine	ND	6B		73B	benzo(a)pyrene	ND
27B		35B	2,4-dinitrotoluene	ND	7B		74B	benzo(b)fluoranthene *	ND
28B		36B	2,6-dinitrotoluene	ND	9B		75B	benzo(k)fluoranthene *	ND
29B		37B	1,2-diphenylhydrazine	ND	18B		76B	chrysene A	ND
31B		39B	fluoranthene	ND	2B		77B	acenaphthylene	ND
17B		40B	4-chlorophenyl phenyl ether	ND	3B		78B	anthracene B	ND

SAMPLE ID Con-2 FRACTION 02G TEST CODE M625 B NAME Method 625 Base/Neutrals
Date & Time Collected 10/07/85 Category

14B	41B	4-bromophenyl phenyl ether	ND	8B	79B	benzo(ghi)perylene	ND
12B	42B	bis(2-chloroisopropyl)ether	ND	32B	80B	fluorene	ND
10B	43B	bis(2-chloroethoxy)methane	ND	44B	81B	phenanthrene B	ND
34B	52B	hexachlorobutadiene	ND	19B	82B	dibenzo(a,h)anthracene	ND
35B	53B	hexachlorocyclopentadiene	ND	37B	83B	indeno(1,2,3-cd)pyrene	ND
38B	54B	isophorone	ND	45B	84B	pyrene	ND
39B	55B	naphthalene	ND				
40B	56B	nitrobenzene	ND				

SURROGATE RECOVERIES

SCAN	CODE	RESULT	
568	BS1	d5-nitrobenzene	107
840	BS2	2-fluorobiphenyl	81
1432	BS3	d14-terphenyl	64
	BS4	d10-biphenyl	na

NOTES AND DEFINITIONS FOR THIS REPORT.

SCAN = scan number or retention time on chromatogram.
All results reported in ug/l unless otherwise specified.
ND = not detected at EPA detection limit method 625, (Federal Register, 10/26/84).
* = benzo(b)fluoranthene and benzo(k)fluoranthene co-elute.
A = benzo(a)anthracene and chrysene co-elute in high concentrations.

SAMPLE ID Con-2 FRACTION 02G TEST CODE M625 B NAME Method 625 Base/Neutrals
Date & Time Collected 10/07/85 Category

B = anthracene and phenanthrene co-elute in high concentrations.
BL = detected in reagent blank; background subtraction not performed.
J = estimated value; less than method detection limit.
CONC. FACTOR: indicates dilution of sample if greater than one (1). Minimum detection limits should be multiplied by conc. factor.

SAMPLE ID Con-2 FRACTION 02E TEST CODE MS 624 NAME EPA Method 624/GC-MS
Date & Time Collected 10/07/85 Category

DATA FILE 4CU10058V02 DATE INJECTED 10/16/85 ANALYST MM VERIFIED BY LAK
CONC. FACTOR 1 INSTRUMENT 3400 COMPOUNDS DETECTED 1

NPDES	SCAN	EPA	COMPOUND	RESULT
3V		4V	benzene	ND
6V		6V	carbon tetrachloride	ND
7V		7V	chlorobenzene	ND
15V		10V	1,2-dichloroethane	ND
27V		11V	1,1,1-trichloroethane	ND
14V		13V	1,1-dichloroethane	ND
28V		14V	1,1,2-trichloroethane	ND
23V		15V	1,1,2,2-tetrachloroethane	ND
9V		16V	chloroethane	ND
10V		19V	2-chloroethylvinyl ether	ND
11V		23V	chloroform	ND
16V		29V	1,1-dichloroethylene	ND
26V		30V	1,2-trans-dichloroethylene	ND
17V		32V	1,2-dichloropropane	ND
18V		33V	cis-1,3-dichloropropylene	ND
18V		33V	trans-1,3-dichloropropylene	ND
19V		38V	ethylbenzene	ND
22V	102	44V	methylene chloride	1.1 B
21V		45V	methyl chloride	ND
20V		46V	methyl bromide	ND
5V		47V	bromoform	ND
12V		48V	dichlorobromomethane	ND
30V		49V	trichlorofluoromethane	ND
8V		51V	chlorodibromomethane	ND
24V		85V	tetrachloroethylene	ND
25V		86V	toluene	ND
29V		87V	trichloroethylene	ND
31V		88V	vinyl chloride	ND

SAMPLE ID Con-2 FRACTION 02E TEST CODE MS 624 NAME EPA Method 624/GC-MS
Date & Time Collected 10/07/85 Category

SURROGATE RECOVERIES

SCAN	CODE	COMPOUND	RESULT
198	VS1	d4-1,2-dichloroethane	86
384	VS2	d8-toluene	100
473	VS3	bromofluorobenzene	95

NOTES AND DEFINITIONS FOR THIS REPORT.
SCAN = scan number or retention time on chromatogram.
All results reported in ug/l unless otherwise specified.
ND = not detected at EPA detection limit method 624, (Federal Register, 10/26/84).
BL = detected in reagent blank; background subtraction not performed.
J = estimated value; less than method detection limit.
CONC. FACTOR: indicates dilution of sample if greater than one (1). Minimum detection limits should be multiplied by conc. factor.

SAMPLE ID Con-3 FRACTION 03A TEST CODE M625 B NAME Method 625 Base/Neutrals
Date & Time Collected 09/27/85 Category

DATA FILE 2CU10058C03 DATE EXTRACTED 10/15/85 ANALYST WL VERIFIED BY LAK
CONC. FACTOR 1 DATE INJECTED 10/22/85 INSTRUMENT 32 COMPOUNDS DETECTED 1

NPDES	SCAN	EPA	COMPOUND	RESULT	NPDES	SCAN	EPA	COMPOUND	RESULT
1B		1B	acenaphthene	ND	41B		61B	N-nitrosodimethylamine	ND
4B		5B	benzidine	ND	43B		62B	N-nitrosodiphenylamine	ND
46B		8B	1,2,4-trichlorobenzene	ND	42B		63B	N-nitrosodi-n-propylamine	ND
33B		9B	hexachlorobenzene	ND	13B		66B	bis(2-ethylhexyl)phthalate	ND
36B		12B	hexachloroethane	ND	15B		67B	butyl benzyl phthalate	ND
11B		18B	bis(2-chloroethyl)ether	ND	26B	1277	68B	di-butyl phthalate	14
16B		20B	2-chloronaphthalene	ND	29B		69B	di-n-octyl phthalate	ND
20B		25B	1,2-dichlorobenzene	ND	24B		70B	diethyl phthalate	ND
21B		26B	1,3-dichlorobenzene	ND	25B		71B	dimethyl phthalate	ND
22B		27B	1,4-dichlorobenzene	ND	5B		72B	benzo(a)anthracene A	ND
23B		28B	3,3'dichlorobenzidine	ND	6B		73B	benzo(a)pyrene	ND
27B		35B	2,4-dinitrotoluene	ND	7B		74B	benzo(b)fluoranthene *	ND
28B		36B	2,6-dinitrotoluene	ND	9B		75B	benzo(k)fluoranthene *	ND
29B		37B	1,2-diphenylhydrazine	ND	18B		76B	chrysene A	ND
31B		39B	fluoranthene	ND	2B		77B	acenaphthylene	ND
17B		40B	4-chlorophenyl phenyl ether	ND	3B		78B	anthracene B	ND

SAMPLE ID Con-3 FRACTION 03A TEST CODE M625 B NAME Method 625 Base/Neutrals
Date & Time Collected 09/27/85 Category

14B	41B	4-bromophenyl phenyl ether	ND	8B	79B	benzo(ghi)perylene	ND
12B	42B	bis(2-chloroisopropyl)ether	ND	32B	80B	fluorene	ND
10B	43B	bis(2-chloroethoxy)methane	ND	44B	81B	phenanthrene B	ND
34B	52B	hexachlorobutadiene	ND	19B	82B	dibenzo(a,h)anthracene	ND
35B	53B	hexachlorocyclopentadiene	ND	37B	83B	indeno(1,2,3-cd)pyrene	ND
38B	54B	isophorone	ND	45B	84B	pyrene	ND
39B	55B	naphthalene	ND				
40B	56B	nitrobenzene	ND				

SURROGATE RECOVERIES

SCAN	CODE	RESULT	
568	BS1	d5-nitrobenzene	82
1066	BS2	2-fluorobiphenyl	74
1430	BS3	d14-terphenyl	53
	BS4	d10-biphenyl	na

NOTES AND DEFINITIONS FOR THIS REPORT.

SCAN = scan number or retention time on chromatogram.
All results reported in ug/l unless otherwise specified.
ND = not detected at EPA detection limit method 625, (Federal Register, 10/26/84).
* = benzo(b)fluoranthene and benzo(k)fluoranthene co-elute.
A = benzo(a)anthracene and chrysene co-elute in high concentrations.

SAMPLE ID Con-3 FRACTION 03A TEST CODE M625 B NAME Method 625 Base/Neutrals
Date & Time Collected 09/27/85 Category

B = anthracene and phenanthrene co-elute in high concentrations.
BL = detected in reagent blank; background subtraction not performed.
J = estimated value; less than method detection limit.
CONC. FACTOR: indicates dilution of sample if greater than one (1). Minimum detection limits should be multiplied by conc. factor.

FRACTION AND TEST CODES FOR WORK NOT REPORTED ELSEWHERE

01F : DUP624
02F : DUP624

CORPORATION

PAGE 1 Analytical Serv REPORT LAB # 86-02-158

RECEIVED: 02/25/86 03/20/86 12:06:58

REPORT TO: Radian
Bl. 4
Austin

ATTEN: Robert Wallace

CLIENT: LINCOLN SAMPLES: 5
COMPANY: Lincoln Properties
FACILITY:

WORK ID: 100 Congress
TAKEN: 2/24/86
TRANS: Fed Ex 736743926
TYPE: H20
P.O. #: 229-025-06-20
INV. #: 7535

PREPARED BY: Radian Analytical Services
8501 MoPac Blvd.
P.O. Box 9948
Austin, Texas 78766

ATTEN:
PHONE: (512) 454-4797

CERTIFIED BY

CONTACT GRIMSHAW

Duplicate of report of 03/16/86.

Footnotes and Comments

* Indicates a value less than 5 times the detection limit. Potential error for such low values ranges between 50 and 100%.

@ Indicates that spike recovery for this analysis on the specific matrix was not within acceptable limits indicating an interferent present.

SAMPLE IDENTIFICATION

01	I-1 ABN H20
01	I-1 ABN H20 VOA
02	B-1 ABN H20
02	B-1 ABN VOA H20
03	E-1 ABN H20
03	E-1 ABN VOA H20
04	E-2 ABN H20
04	E-2 VOA H20
05	Reagent Blank 624
05	Reagent Blank 625

Analytical Serv TEST CODES and NAMES used on this report

EX 625	Extraction only - 625 BN/A
IFB VS	VOA Screen by IFB method
M625 A	Method 625 Acid Compounds
M625 B	Method 625 Base/Neutrals
MS 624	EPA Method 624/GC-MS

TEST CODE default units	Sample 01 (entered units)	Sample 02 (entered units)	Sample 03 (entered units)	Sample 04 (entered units)	Sample 05 (entered units)
EX_625 date complete	02/26/86	02/26/86	02/26/86	02/26/86	02/26/86
IFB_VS date complete	02/25/86	02/25/86	02/25/86	02/25/86	

CORPORATION

PAGE 3 Analytical Serv REPORT LAB # 86-02-158
RECEIVED: 02/25/86 Results by Sample

SAMPLE ID I-1 ABN H20 FRACTION 01A TEST CODE M625 A NAME Method 625 Acid Compounds
Date & Time Collected 02/24/86 Category

DATA FILE 5CU02158C01 DATE EXTRACTED 02/26/86 ANALYST WJL VERIFIED BY LAK
CONC. FACTOR 1 DATE INJECTED 03/10/86 INSTRUMENT 5100 COMPOUNDS DETECTED 1

NPDES	SCAN	EPA	COMPOUND	RESULT	NPDES	SCAN	EPA	COMPOUND	RESULT
11A		21A	2,4,6-trichlorophenol	ND	7A		58A	4-nitrophenol	ND
8A		22A	4-chloro-3-methylphenol	ND	5A		59A	2,4-dinitrophenol	ND
1A		24A	2-chlorophenol	ND	4A		60A	2-methyl-4,6-dinitrophenol	ND
2A		31A	2,4-dichlorophenol	ND	9A		64A	pentachlorophenol	ND
3A		34A	2,4-dimethylphenol	ND	10A	392	65A	phenol	2
6A		57A	2-nitrophenol	ND					

SURROGATE RECOVERIES

SCAN	CODE	COMPOUND	RESULT
390	AS1	d5-phenol	90
286	AS2	2-fluorophenol	88
987	AS3	2,4,6-tribromophenol	156
	AS4	d3-phenol	

NOTES AND DEFINITIONS FOR THIS REPORT.
SCAN = scan number or retention time on chromatogram.
All results reported in ug/l unless otherwise specified.

SAMPLE ID I-1 ABN H20 FRACTION 01A TEST CODE M625 A NAME Method 625 Acid Compounds
Date & Time Collected 02/24/86 Category

ND = not detected at EPA detection limit method 625, (Federal Register, 11/26/84).
BL = detected in reagent blank; background subtraction not performed.
J = estimated value; less than method detection limit.
CONC. FACTOR: indicates dilution of sample if greater than one (1). Minimum detection limits should be multiplied by conc. factor.

CORPORATION

PAGE 5 Analytical Serv REPORT LAB # 86-02-158
RECEIVED: 02/25/86 Results by Sample

SAMPLE ID I-1 ABN H2O FRACTION 01A TEST CODE M625 B NAME Method 625 Base/Neutrals
Date & Time Collected 02/24/86 Category

DATA FILE 5CU02158C01 DATE EXTRACTED 02/26/86 ANALYST WJL VERIFIED BY LAK
CONC. FACTOR 1 DATE INJECTED 03/10/86 INSTRUMENT 5100 COMPOUNDS DETECTED 2

NPDES	SCAN	EPA	COMPOUND	RESULT	NPDES	SCAN	EPA	COMPOUND	RESULT
1B		1B	acenaphthene	ND	41B		61B	N-nitrosodimethylamine	ND
4B		5B	benzidine	ND	43B		62B	N-nitrosodiphenylamine	ND
46B		8B	1,2,4-trichlorobenzene	ND	42B		63B	N-nitrosodi-n-propylamine	ND
33B		9B	hexachlorobenzene	ND	13B	1520	66B	bis(2-ethylhexyl)phthalate	3
36B		12B	hexachloroethane	ND	15B		67B	butyl benzyl phthalate	ND
11B		18B	bis(2-chloroethyl)ether	ND	26B	1194	68B	di-butyl phthalate	3 BL
16B		20B	2-chloronaphthalene	ND	29B		69B	di-n-octyl phthalate	ND
20B		25B	1,2-dichlorobenzene	ND	24B		70B	diethyl phthalate	ND
21B		26B	1,3-dichlorobenzene	ND	25B		71B	dimethyl phthalate	ND
22B		27B	1,4-dichlorobenzene	ND	5B		72B	benzo(a)anthracene A	ND
23B		28B	3,3'dichlorobenzidine	ND	6B		73B	benzo(a)pyrene	ND
27B		35B	2,4-dinitrotoluene	ND	7B		74B	benzo(b)fluoranthene *	ND
28B		36B	2,6-dinitrotoluene	ND	9B		75B	benzo(k)fluoranthene *	ND
29B		37B	1,2-diphenylhydrazine	ND	18B		76B	chrysene A	ND
31B		39B	fluoranthene	ND	2B		77B	acenaphthylene	ND
17B		40B	4-chlorophenyl phenyl ether	ND	3B		78B	anthracene B	ND

SAMPLE ID I-1 ABN H2O FRACTION 01A TEST CODE M625 B NAME Method 625 Base/Neutrals
Date & Time Collected 02/24/86 Category

14B	41B	4-bromophenyl phenyl ether	ND	8B	79B	benzo(ghi)perylene	ND
12B	42B	bis(2-chloroisopropyl)ether	ND	32B	80B	fluorene	ND
10B	43B	bis(2-chloroethoxy)methane	ND	44B	81B	phenanthrene B	ND
34B	52B	hexachlorobutadiene	ND	19B	82B	dibenzo(a,h)anthracene	ND
35B	53B	hexachlorocyclopentadiene	ND	37B	83B	indeno(1,2,3-cd)pyrene	ND
38B	54B	isophorone	ND	45B	84B	pyrene	ND
39B	55B	naphthalene	ND				
40B	56B	nitrobenzene	ND				

SURROGATE RECOVERIES

SCAN	CODE	RESULT	
504	BS1	d5-nitrobenzene	102
776	BS2	2-fluorobiphenyl	112
1342	BS3	d14-terphenyl	56
	BS4	d10-biphenyl	

NOTES AND DEFINITIONS FOR THIS REPORT.

SCAN = scan number or retention time on chromatogram.
All results reported in ug/l unless otherwise specified.
ND = not detected at EPA detection limit method 625, (Federal Register, 10/26/84).
* = benzo(b)fluoranthene and benzo(k)fluoranthene co-elute.
A = benzo(a)anthracene and chrysene co-elute in high concentrations.

SAMPLE ID I-1 ABN H2O FRACTION 01A TEST CODE M625 B NAME Method 625 Base/Neutrals
Date & Time Collected 02/24/86 Category

B = anthracene and phenanthrene co-elute in high concentrations.
BL = detected in reagent blank; background subtraction not performed.
J = estimated value; less than method detection limit.
CONC. FACTOR: indicates dilution of sample if greater than one (1). Minimum detection limits should be multiplied by conc. factor.

SAMPLE ID I-1 ABN H2O VOA FRACTION 01B TEST CODE MS 624 NAME EPA Method 624/GC-MS
Date & Time Collected 02/24/86 Category

DATA FILE 4CU02158V01 DATE INJECTED 03/04/86 ANALYST REM VERIFIED BY LAK
CONC. FACTOR 1 INSTRUMENT F4 COMPOUNDS DETECTED 1

NPDES	SCAN	EPA	COMPOUND	RESULT	NPDES	SCAN	EPA	COMPOUND	RESULT
3V		4V	benzene	ND	17V		32V	1,2-dichloropropane	ND
6V		6V	carbon tetrachloride	ND	18V		33V	cis-1,3-dichloropropylene	ND
7V		7V	chlorobenzene	ND	18V		33V	trans-1,3-dichloropropylene	ND
15V		10V	1,2-dichloroethane	ND	19V		38V	ethylbenzene	ND
27V		11V	1,1,1-trichloroethane	ND	22V	103	44V	methylene chloride	1 J
14V		13V	1,1-dichloroethane	ND	21V		45V	methyl chloride	ND
28V		14V	1,1,2-trichloroethane	ND	20V		46V	methyl bromide	ND
23V		15V	1,1,2,2-tetrachloroethane	ND	5V		47V	bromoform	ND
9V		16V	chloroethane	ND	12V		48V	dichlorobromomethane	ND
10V		19V	2-chloroethylvinyl ether	ND	30V		49V	trichlorofluoromethane	ND
11V		23V	chloroform	ND	8V		51V	chlorodibromomethane	ND
16V		29V	1,1-dichloroethylene	ND	24V		85V	tetrachloroethylene	ND
26V		30V	1,2-trans-dichloroethylene	ND	25V		86V	toluene	ND
					29V		87V	trichloroethylene	ND
					31V		88V	vinyl chloride	ND

SAMPLE ID I-1 ABN H2O VOA FRACTION 01B TEST CODE MS 624 NAME EPA Method 624/GC-MS
Date & Time Collected 02/24/86 Category

SURROGATE RECOVERIES

SCAN	CODE	COMPOUND	RESULT
199	VS1	d4-1,2-dichloroethane	105
377	VS2	d8-toluene	98
466	VS3	bromofluorobenzene	101

NOTES AND DEFINITIONS FOR THIS REPORT.
SCAN = scan number or retention time on chromatogram.
All results reported in ug/l unless otherwise specified.
ND = not detected at EPA detection limit method 624, (Federal Register, 10/26/84).
BL = detected in reagent blank; background subtraction not performed.
J = estimated value; less than method detection limit.
CONC. FACTOR: indicates dilution of sample if greater than one (1). Minimum detection limits should be multiplied by conc. factor.

CORPORATION

PAGE 10 Analytical Serv REPORT LAB # 86-02-158
RECEIVED: 02/25/86 Results by Sample

SAMPLE ID B-1 ABN H2O FRACTION 02A TEST CODE M625 A NAME Method 625 Acid Compounds
Date & Time Collected 02/24/86 Category

DATA FILE 5CU02158C12 DATE EXTRACTED 02/26/86 ANALYST WJL VERIFIED BY LAK
CONC. FACTOR 1 DATE INJECTED 03/10/86 INSTRUMENT 5100 COMPOUNDS DETECTED 1

NPDES	SCAN	EPA	COMPOUND	RESULT	NPDES	SCAN	EPA	COMPOUND	RESULT
11A		21A	2,4,6-trichlorophenol	ND	7A		58A	4-nitrophenol	ND
8A		22A	4-chloro-3-methylphenol	ND	5A		59A	2,4-dinitrophenol	ND
1A		24A	2-chlorophenol	ND	4A		60A	2-methyl-4,6-dinitrophenol	ND
2A		31A	2,4-dichlorophenol	ND	9A		64A	pentachlorophenol	ND
3A		34A	2,4-dimethylphenol	ND	10A	391	65A	phenol	1
6A		57A	2-nitrophenol	ND					

SURROGATE RECOVERIES

SCAN	CODE	COMPOUND	RESULT
390	AS1	d5-phenol	87
285	AS2	2-fluorophenol	89
987	AS3	2,4,6-tribromophenol	160
	AS4	d3-phenol	

NOTES AND DEFINITIONS FOR THIS REPORT.
SCAN = scan number or retention time on chromatogram.
All results reported in ug/l unless otherwise specified.

SAMPLE ID B-1 ABN H20 FRACTION 02A TEST CODE M625 A NAME Method 625 Acid Compounds
Date & Time Collected 02/24/86 Category

ND = not detected at EPA detection limit method 625, (Federal Register, 11/26/84).
BL = detected in reagent blank; background subtraction not performed.
J = estimated value; less than method detection limit.
CONC. FACTOR: indicates dilution of sample if greater than one (1). Minimum detection limits should be multiplied by conc. factor.

CORPORATION

PAGE 12 Analytical Serv REPORT LAB # 86-02-158
RECEIVED: 02/25/86 Results by Sample

SAMPLE ID B-1 ABN H2O FRACTION 02A TEST CODE M625 B NAME Method 625 Base/Neutrals
Date & Time Collected 02/24/86 Category

DATA FILE 5CU02158C12 DATE EXTRACTED 02/26/86 ANALYST WJL VERIFIED BY LAK
CONC. FACTOR 1 DATE INJECTED 03/10/86 INSTRUMENT 5100 COMPOUNDS DETECTED 2

NPDES	SCAN	EPA	COMPOUND	RESULT	NPDES	SCAN	EPA	COMPOUND	RESULT
1B		1B	acenaphthene	ND	41B		61B	N-nitrosodimethylamine	ND
4B		5B	benzidine	ND	43B		62B	N-nitrosodiphenylamine	ND
46B		8B	1,2,4-trichlorobenzene	ND	42B		63B	N-nitrosodi-n-propylamine	ND
33B		9B	hexachlorobenzene	ND	13B	1520	66B	bis(2-ethylhexyl)phthalate	1
36B		12B	hexachloroethane	ND	15B		67B	butyl benzyl phthalate	ND
11B		18B	bis(2-chloroethyl)ether	ND	26B	1194	68B	di-butyl phthalate	2 BL
16B		20B	2-chloronaphthalene	ND	29B		69B	di-n-octyl phthalate	ND
20B		25B	1,2-dichlorobenzene	ND	24B		70B	diethyl phthalate	ND
21B		26B	1,3-dichlorobenzene	ND	25B		71B	dimethyl phthalate	ND
22B		27B	1,4-dichlorobenzene	ND	5B		72B	benzo(a)anthracene A	ND
23B		28B	3,3'dichlorobenzidine	ND	6B		73B	benzo(a)pyrene	ND
27B		35B	2,4-dinitrotoluene	ND	7B		74B	benzo(b)fluoranthene *	ND
28B		36B	2,6-dinitrotoluene	ND	9B		75B	benzo(k)fluoranthene *	ND
29B		37B	1,2-diphenylhydrazine	ND	18B		76B	chrysene A	ND
31B		39B	fluoranthene	ND	2B		77B	acenaphthylene	ND
17B		40B	4-chlorophenyl phenyl ether	ND	3B		78B	anthracene B	ND

SAMPLE ID B-1 ABN H2O FRACTION 02A TEST CODE M625 B NAME Method 625 Base/Neutrals
Date & Time Collected 02/24/86 Category

14B	41B	4-bromophenyl phenyl ether	ND	8B	79B	benzo(ghi)perylene	ND
12B	42B	bis(2-chloroisopropyl)ether	ND	32B	80B	fluorene	ND
10B	43B	bis(2-chloroethoxy)methane	ND	44B	81B	phenanthrene B	ND
34B	52B	hexachlorobutadiene	ND	19B	82B	dibenzo(a,h)anthracene	ND
35B	53B	hexachlorocyclopentadiene	ND	37B	83B	indeno(1,2,3-cd)pyrene	ND
38B	54B	isophorone	ND	45B	84B	pyrene	ND
39B	55B	naphthalene	ND				
40B	56B	nitrobenzene	ND				

SURROGATE RECOVERIES

SCAN	CODE	RESULT	
504	BS1	d5-nitrobenzene	82
766	BS2	2-fluorobiphenyl	92
1342	BS3	d14-terphenyl	48
	BS4	d10-biphenyl	

NOTES AND DEFINITIONS FOR THIS REPORT.

SCAN = scan number or retention time on chromatogram.
All results reported in ug/l unless otherwise specified.
ND = not detected at EPA detection limit method 625, (Federal Register, 10/26/84).
* = benzo(b)fluoranthene and benzo(k)fluoranthene co-elute.
A = benzo(a)anthracene and chrysene co-elute in high concentrations.

SAMPLE ID B-1 ABN H2O FRACTION 02A TEST CODE M625 B NAME Method 625 Base/Neutrals
Date & Time Collected 02/24/86 Category

B = anthracene and phenanthrene co-elute in high concentrations.
BL = detected in reagent blank; background subtraction not performed.
J = estimated value; less than method detection limit.
CONC. FACTOR: indicates dilution of sample if greater than one (1). Minimum detection limits should be multiplied by conc. factor.

SAMPLE ID B-1 ABN VOA H2O FRACTION 02B TEST CODE MS 624 NAME EPA Method 624/GC-MS
Date & Time Collected 02/24/86 Category

DATA FILE 4CU02158V02 DATE INJECTED 03/04/86 ANALYST REM VERIFIED BY LAK
CONC. FACTOR 1 INSTRUMENT F4 COMPOUNDS DETECTED 0

NPDES	SCAN	EPA	COMPOUND	RESULT	NPDES	SCAN	EPA	COMPOUND	RESULT
3V		4V	benzene	ND	17V		32V	1,2-dichloropropane	ND
6V		6V	carbon tetrachloride	ND	18V		33V	cis-1,3-dichloropropylene	ND
7V		7V	chlorobenzene	ND	18V		33V	trans-1,3-dichloropropylene	ND
15V		10V	1,2-dichloroethane	ND	19V		38V	ethylbenzene	ND
27V		11V	1,1,1-trichloroethane	ND	22V		44V	methylene chloride	ND
14V		13V	1,1-dichloroethane	ND	21V		45V	methyl chloride	ND
28V		14V	1,1,2-trichloroethane	ND	20V		46V	methyl bromide	ND
23V		15V	1,1,2,2-tetrachloroethane	ND	5V		47V	bromoform	ND
9V		16V	chloroethane	ND	12V		48V	dichlorobromomethane	ND
10V		19V	2-chloroethylvinyl ether	ND	30V		49V	trichlorofluoromethane	ND
11V		23V	chloroform	ND	8V		51V	chlorodibromomethane	ND
16V		29V	1,1-dichloroethylene	ND	24V		85V	tetrachloroethylene	ND
26V		30V	1,2-trans-dichloroethylene	ND	25V		86V	toluene	ND
					29V		87V	trichloroethylene	ND
					31V		88V	vinyl chloride	ND

SAMPLE ID B-1 ABN VOA H2O FRACTION 02B TEST CODE MS 624 NAME EPA Method 624/GC-MS
Date & Time Collected 02/24/86 Category

SURROGATE RECOVERIES

SCAN	CODE	COMPOUND	RESULT
200	VS1	d4-1,2-dichloroethane	108
377	VS2	d8-toluene	98
465	VS3	bromofluorobenzene	99

NOTES AND DEFINITIONS FOR THIS REPORT.
SCAN = scan number or retention time on chromatogram.
All results reported in ug/l unless otherwise specified.
ND = not detected at EPA detection limit method 624, (Federal Register, 10/26/84).
BL = detected in reagent blank; background subtraction not performed.
J = estimated value; less than method detection limit.
CONC. FACTOR: indicates dilution of sample if greater than one (1). Minimum detection limits should be multiplied by conc. factor.

SAMPLE ID E-1 ABN H2O FRACTION 03A TEST CODE M625 A NAME Method 625 Acid Compounds
Date & Time Collected 02/24/86 Category

DATA FILE 5CU02158C03 DATE EXTRACTED 02/26/86 ANALYST WJL VERIFIED BY LAK
CONC. FACTOR 1 DATE INJECTED 03/10/86 INSTRUMENT 5100 COMPOUNDS DETECTED 0

NPDES	SCAN	EPA	COMPOUND	RESULT	NPDES	SCAN	EPA	COMPOUND	RESULT
11A		21A	2,4,6-trichlorophenol	ND	7A		58A	4-nitrophenol	ND
8A		22A	4-chloro-3-methylphenol	ND	5A		59A	2,4-dinitrophenol	ND
1A		24A	2-chlorophenol	ND	4A		60A	2-methyl-4,6-dinitrophenol	ND
2A		31A	2,4-dichlorophenol	ND	9A		64A	pentachlorophenol	ND
3A		34A	2,4-dimethylphenol	ND	10A		65A	phenol	ND
6A		57A	2-nitrophenol	ND					

SURROGATE RECOVERIES

SCAN	CODE	COMPOUND	RESULT
389	AS1	d5-phenol	82
284	AS2	2-fluorophenol	86
987	AS3	2,4,6-tribromophenol	124
	AS4	d3-phenol	

NOTES AND DEFINITIONS FOR THIS REPORT.
SCAN = scan number or retention time on chromatogram.
All results reported in ug/l unless otherwise specified.

SAMPLE ID E-1 ABN H20 FRACTION 03A TEST CODE M625 A NAME Method 625 Acid Compounds
Date & Time Collected 02/24/86 Category

ND = not detected at EPA detection limit method 625, (Federal Register, 11/26/84).
BL = detected in reagent blank; background subtraction not performed.
J = estimated value; less than method detection limit.
CONC. FACTOR: indicates dilution of sample if greater than one (1). Minimum detection limits should be multiplied by conc. factor.

SAMPLE ID E-1 ABN H20 FRACTION 03A TEST CODE M625 B NAME Method 625 Base/Neutrals
Date & Time Collected 02/24/86 Category

DATA FILE 5CU02158C03 DATE EXTRACTED 02/26/86 ANALYST WJL VERIFIED BY LAK
CONC. FACTOR 1 DATE INJECTED 03/10/86 INSTRUMENT 5100 COMPOUNDS DETECTED 2

NPDES	SCAN	EPA	COMPOUND	RESULT	NPDES	SCAN	EPA	COMPOUND	RESULT
1B		1B	acenaphthene	ND	41B		61B	N-nitrosodimethylamine	ND
4B		5B	benzidine	ND	43B		62B	N-nitrosodiphenylamine	ND
46B		8B	1,2,4-trichlorobenzene	ND	42B		63B	N-nitrosodi-n-propylamine	ND
33B		9B	hexachlorobenzene	ND	13B	1522	66B	bis(2-ethylhexyl)phthalate	2
36B		12B	hexachloroethane	ND	15B		67B	butyl benzyl phthalate	ND
11B		18B	bis(2-chloroethyl)ether	ND	26B	1195	68B	di-butyl phthalate	2 BL
16B		20B	2-chloronaphthalene	ND	29B		69B	di-n-octyl phthalate	ND
20B		25B	1,2-dichlorobenzene	ND	24B		70B	diethyl phthalate	ND
21B		26B	1,3-dichlorobenzene	ND	25B		71B	dimethyl phthalate	ND
22B		27B	1,4-dichlorobenzene	ND	5B		72B	benzo(a)anthracene A	ND
23B		28B	3,3'dichlorobenzidine	ND	6B		73B	benzo(a)pyrene	ND
27B		35B	2,4-dinitrotoluene	ND	7B		74B	benzo(b)fluoranthene *	ND
28B		36B	2,6-dinitrotoluene	ND	9B		75B	benzo(k)fluoranthene *	ND
29B		37B	1,2-diphenylhydrazine	ND	18B		76B	chrysene A	ND
31B		39B	fluoranthene	ND	2B		77B	acenaphthylene	ND
17B		40B	4-chlorophenyl phenyl ether	ND	3B		78B	anthracene B	ND

SAMPLE ID E-1 ABN H2O FRACTION 03A TEST CODE M625 B NAME Method 625 Base/Neutrals
Date & Time Collected 02/24/86 Category

14B	41B	4-bromophenyl phenyl ether	ND	8B	79B	benzo(ghi)perylene	ND
12B	42B	bis(2-chloroisopropyl)ether	ND	32B	80B	fluorene	ND
10B	43B	bis(2-chloroethoxy)methane	ND	44B	81B	phenanthrene B	ND
34B	52B	hexachlorobutadiene	ND	19B	82B	dibenzo(a,h)anthracene	ND
35B	53B	hexachlorocyclopentadiene	ND	37B	83B	indeno(1,2,3-cd)pyrene	ND
38B	54B	isophorone	ND	45B	84B	pyrene	ND
39B	55B	naphthalene	ND				
40B	56B	nitrobenzene	ND				

SURROGATE RECOVERIES

SCAN	CODE	RESULT	
504	BS1	d5-nitrobenzene	70
766	BS2	2-fluorobiphenyl	80
1343	BS3	d14-terphenyl	38
	BS4	d10-biphenyl	

NOTES AND DEFINITIONS FOR THIS REPORT.

SCAN = scan number or retention time on chromatogram.
All results reported in ug/l unless otherwise specified.
ND = not detected at EPA detection limit method 625, (Federal Register, 10/26/84).
* = benzo(b)fluoranthene and benzo(k)fluoranthene co-elute.
A = benzo(a)anthracene and chrysene co-elute in high concentrations.

SAMPLE ID E-1 ABN H2O FRACTION 03A TEST CODE M625 B NAME Method 625 Base/Neutrals
Date & Time Collected 02/24/86 Category

B = anthracene and phenanthrene co-elute in high concentrations.
BL = detected in reagent blank; background subtraction not performed.
J = estimated value; less than method detection limit.
CONC. FACTOR: indicates dilution of sample if greater than one (1). Minimum detection limits should be multiplied by conc. factor.

SAMPLE ID E-1 ABN VOA H2O FRACTION 03B TEST CODE MS 624 NAME EPA Method 624/GC-MS
Date & Time Collected 02/24/86 Category

DATA FILE 4CU02158V03 DATE INJECTED 03/04/86 ANALYST REM VERIFIED BY LAK
CONC. FACTOR 1 INSTRUMENT F4 COMPOUNDS DETECTED 0

NPDES	SCAN	EPA	COMPOUND	RESULT
3V		4V	benzene	ND
6V		6V	carbon tetrachloride	ND
7V		7V	chlorobenzene	ND
15V		10V	1,2-dichloroethane	ND
27V		11V	1,1,1-trichloroethane	ND
14V		13V	1,1-dichloroethane	ND
28V		14V	1,1,2-trichloroethane	ND
23V		15V	1,1,2,2-tetrachloroethane	ND
9V		16V	chloroethane	ND
10V		19V	2-chloroethylvinyl ether	ND
11V		23V	chloroform	ND
16V		29V	1,1-dichloroethylene	ND
26V		30V	1,2-trans-dichloroethylene	ND
17V		32V	1,2-dichloropropane	ND
18V		33V	cis-1,3-dichloropropylene	ND
18V		33V	trans-1,3-dichloropropylene	ND
19V		38V	ethylbenzene	ND
22V		44V	methylene chloride	ND
21V		45V	methyl chloride	ND
20V		46V	methyl bromide	ND
5V		47V	bromoform	ND
12V		48V	dichlorobromomethane	ND
30V		49V	trichlorofluoromethane	ND
8V		51V	chlorodibromomethane	ND
24V		85V	tetrachloroethylene	ND
25V		86V	toluene	ND
29V		87V	trichloroethylene	ND
31V		88V	vinyl chloride	ND

SAMPLE ID E-1 ABN VOA H2O FRACTION 03B TEST CODE MS 624 NAME EPA Method 624/GC-MS
Date & Time Collected 02/24/86 Category

SURROGATE RECOVERIES

SCAN	CODE	COMPOUND	RESULT
200	VS1	d4-1,2-dichloroethane	103
377	VS2	d8-toluene	101
466	VS3	bromofluorobenzene	99

NOTES AND DEFINITIONS FOR THIS REPORT.
SCAN = scan number or retention time on chromatogram.
All results reported in ug/l unless otherwise specified.
ND = not detected at EPA detection limit method 624, (Federal Register, 10/26/84).
BL = detected in reagent blank; background subtraction not performed.
J = estimated value; less than method detection limit.
CONC. FACTOR: indicates dilution of sample if greater than one (1). Minimum detection limits should be multiplied by conc. factor.

CORPORATION

PAGE 24 Analytical Serv REPORT LAB # 86-02-158
RECEIVED: 02/25/86 Results by Sample

SAMPLE ID E-2 ABN H20 FRACTION 04A TEST CODE M625 A NAME Method 625 Acid Compounds
Date & Time Collected 02/24/86 Category

DATA FILE 5CU0215BC04 DATE EXTRACTED 02/26/86 ANALYST WJL VERIFIED BY LAK
CONC. FACTOR 1 DATE INJECTED 03/10/86 INSTRUMENT 5100 COMPOUNDS DETECTED 1

NPDES	SCAN	EPA	COMPOUND	RESULT	NPDES	SCAN	EPA	COMPOUND	RESULT
11A		21A	2,4,6-trichlorophenol	ND	7A		58A	4-nitrophenol	ND
8A		22A	4-chloro-3-methylphenol	ND	5A		59A	2,4-dinitrophenol	ND
1A		24A	2-chlorophenol	ND	4A		60A	2-methyl-4,6-dinitrophenol	ND
2A		31A	2,4-dichlorophenol	ND	9A		64A	pentachlorophenol	ND
3A		34A	2,4-dimethylphenol	ND	10A	392	65A	phenol	2
6A		57A	2-nitrophenol	ND					

SURROGATE RECOVERIES

SCAN	CODE	COMPOUND	RESULT
390	AS1	d5-phenol	79
287	AS2	2-fluorophenol	82
987	AS3	2,4,6-tribromophenol	116
	AS4	d3-phenol	

NOTES AND DEFINITIONS FOR THIS REPORT.
SCAN = scan number or retention time on chromatogram.
All results reported in ug/l unless otherwise specified.

SAMPLE ID E-2 ABN H20 FRACTION 04A TEST CODE M625 A NAME Method 625 Acid Compounds
Date & Time Collected 02/24/86 Category

ND = not detected at EPA detection limit method 625, (Federal Register, 11/26/84).
BL = detected in reagent blank; background subtraction not performed.
J = estimated value; less than method detection limit.
CONC. FACTOR: indicates dilution of sample if greater than one (1). Minimum detection limits should be multiplied by conc. factor.

CONFIGURATION

PAGE 26 Analytical Serv REPORT LAB # 86-02-158
RECEIVED: 02/25/86 Results by Sample

SAMPLE ID E-2 ABN H2O FRACTION 04A TEST CODE M625 B NAME Method 625 Base/Neutrals
Date & Time Collected 02/24/86 Category

DATA FILE 5CU02158C04 DATE EXTRACTED 02/26/86 ANALYST WJL VERIFIED BY LAK
CONC. FACTOR 1 DATE INJECTED 03/10/86 INSTRUMENT 5100 COMPOUNDS DETECTED 2

NPDES	SCAN	EPA	COMPOUND	RESULT	NPDES	SCAN	EPA	COMPOUND	RESULT
1B		1B	acenaphthene	ND	41B		61B	N-nitrosodimethylamine	ND
4B		5B	benzidine	ND	43B		62B	N-nitrosodiphenylamine	ND
46B		8B	1,2,4-trichlorobenzene	ND	42B		63B	N-nitrosodi-n-propylamine	ND
33B		9B	hexachlorobenzene	ND	13B	1521	66B	bis(2-ethylhexyl)phthalate	1
36B		12B	hexachloroethane	ND	15B		67B	butyl benzyl phthalate	ND
11B		18B	bis(2-chloroethyl)ether	ND	26B	1194	68B	di-butyl phthalate	2 BL
16B		20B	2-chloronaphthalene	ND	29B		69B	di-n-octyl phthalate	ND
20B		25B	1,2-dichlorobenzene	ND	24B		70B	diethyl phthalate	ND
21B		26B	1,3-dichlorobenzene	ND	25B		71B	dimethyl phthalate	ND
22B		27B	1,4-dichlorobenzene	ND	5B		72B	benzo(a)anthracene A	ND
23B		28B	3,3'dichlorobenzidine	ND	6B		73B	benzo(a)pyrene	ND
27B		35B	2,4-dinitrotoluene	ND	7B		74B	benzo(b)fluoranthene *	ND
28B		36B	2,6-dinitrotoluene	ND	9B		75B	benzo(k)fluoranthene *	ND
29B		37B	1,2-diphenylhydrazine	ND	18B		76B	chrysene A	ND
31B		39B	fluoranthene	ND	2B		77B	acenaphthylene	ND
17B		40B	4-chlorophenyl phenyl ether	ND	3B		78B	anthracene B	ND

SAMPLE ID E-2 ABN H20 FRACTION 04A TEST CODE M625 B NAME Method 625 Base/Neutrals
Date & Time Collected 02/24/86 Category

14B	41B	4-bromophenyl phenyl ether	ND	8B	79B	benzo(ghi)perylene	ND
12B	42B	bis(2-chloroisopropyl)ether	ND	32B	80B	fluorene	ND
10B	43B	bis(2-chloroethoxy)methane	ND	44B	81B	phenanthrene B	ND
34B	52B	hexachlorobutadiene	ND	19B	82B	dibenzo(a,h)anthracene	ND
35B	53B	hexachlorocyclopentadiene	ND	37B	83B	indeno(1,2,3-cd)pyrene	ND
38B	54B	isophorone	ND	45B	84B	pyrene	ND
39B	55B	naphthalene	ND				
40B	56B	nitrobenzene	ND				

SURROGATE RECOVERIES

SCAN	CODE	RESULT	
504	BS1	d5-nitrobenzene	96
766	BS2	2-fluorobiphenyl	112
1342	BS3	d14-terphenyl	46
	BS4	d10-biphenyl	

NOTES AND DEFINITIONS FOR THIS REPORT.

SCAN = scan number or retention time on chromatogram.
All results reported in ug/l unless otherwise specified.
ND = not detected at EPA detection limit method 625, (Federal Register, 10/26/84).
* = benzo(b)fluoranthene and benzo(k)fluoranthene co-elute.
A = benzo(a)anthracene and chrysene co-elute in high concentrations.

SAMPLE ID E-2 ABN H2O FRACTION 04A TEST CODE M625 B NAME Method 625 Base/Neutrals
Date & Time Collected 02/24/86 Category

B = anthracene and phenanthrene co-elute in high concentrations.
BL = detected in reagent blank; background subtraction not performed.
J = estimated value; less than method detection limit.
CONC. FACTOR: indicates dilution of sample if greater than one (1). Minimum detection limits should be multiplied by conc. factor.

SAMPLE ID E-2 VOA H2O FRACTION 04B TEST CODE MS 624 NAME EPA Method 624/GC-MS
Date & Time Collected 02/24/86 Category

DATA FILE 4CU02158V04 DATE INJECTED 03/04/86 ANALYST REM VERIFIED BY LAK
CONC. FACTOR 1 INSTRUMENT F4 COMPOUNDS DETECTED 0

NPDES	SCAN	EPA	COMPOUND	RESULT	NPDES	SCAN	EPA	COMPOUND	RESULT
3V		4V	benzene	ND	17V		32V	1,2-dichloropropane	ND
6V		6V	carbon tetrachloride	ND	18V		33V	cis-1,3-dichloropropylene	ND
7V		7V	chlorobenzene	ND	18V		33V	trans-1,3-dichloropropylene	ND
15V		10V	1,2-dichloroethane	ND	19V		38V	ethylbenzene	ND
27V		11V	1,1,1-trichloroethane	ND	22V		44V	methylene chloride	ND
14V		13V	1,1-dichloroethane	ND	21V		45V	methyl chloride	ND
28V		14V	1,1,2-trichloroethane	ND	20V		46V	methyl bromide	ND
23V		15V	1,1,2,2-tetrachloroethane	ND	5V		47V	bromoform	ND
9V		16V	chloroethane	ND	12V		48V	dichlorobromomethane	ND
10V		19V	2-chloroethylvinyl ether	ND	30V		49V	trichlorofluoromethane	ND
11V		23V	chloroform	ND	8V		51V	chlorodibromomethane	ND
16V		29V	1,1-dichloroethylene	ND	24V		85V	tetrachloroethylene	ND
26V		30V	1,2-trans-dichloroethylene	ND	25V		86V	toluene	ND
					29V		87V	trichloroethylene	ND
					31V		88V	vinyl chloride	ND

SAMPLE ID Reagent Blank 624 FRACTION 05B TEST CODE MS 624 NAME EPA Method 624/GC-MS
Date & Time Collected not specified Category

DATA FILE 4EB0304V000 DATE INJECTED 03/04/86 ANALYST MM VERIFIED BY LAK
CONC. FACTOR 1 INSTRUMENT F4 COMPOUNDS DETECTED 0

NPDES	SCAN	EPA	COMPOUND	RESULT	NPDES	SCAN	EPA	COMPOUND	RESULT
3V		4V	benzene	ND	17V		32V	1,2-dichloropropane	ND
6V		6V	carbon tetrachloride	ND	18V		33V	cis-1,3-dichloropropylene	ND
7V		7V	chlorobenzene	ND	18V		33V	trans-1,3-dichloropropylene	ND
15V		10V	1,2-dichloroethane	ND	19V		38V	ethylbenzene	ND
27V		11V	1,1,1-trichloroethane	ND	22V		44V	methylene chloride	ND
14V		13V	1,1-dichloroethane	ND	21V		45V	methyl chloride	ND
28V		14V	1,1,2-trichloroethane	ND	20V		46V	methyl bromide	ND
23V		15V	1,1,2,2-tetrachloroethane	ND	5V		47V	bromoform	ND
9V		16V	chloroethane	ND	12V		48V	dichlorobromomethane	ND
10V		19V	2-chloroethylvinyl ether	ND	30V		49V	trichlorofluoromethane	ND
11V		23V	chloroform	ND	8V		51V	chlorodibromomethane	ND
16V		29V	1,1-dichloroethylene	ND	24V		85V	tetrachloroethylene	ND
26V		30V	1,2-trans-dichloroethylene	ND	25V		86V	toluene	ND
					29V		87V	trichloroethylene	ND
					31V		88V	vinyl chloride	ND

SAMPLE ID Reagent Blank 624 FRACTION 05B TEST CODE MS 624 NAME EPA Method 624/GC-MS
Date & Time Collected not specified Category

SURROGATE RECOVERIES

SCAN	CODE	COMPOUND	RESULT
200	VS1	d4-1,2-dichloroethane	101
377	VS2	d8-toluene	95
466	VS3	bromofluorobenzene	102

NOTES AND DEFINITIONS FOR THIS REPORT.
SCAN = scan number or retention time on chromatogram.
All results reported in ug/l unless otherwise specified.
ND = not detected at EPA detection limit method 624, (Federal Register, 10/26/84).
BL = detected in reagent blank; background subtraction not performed.
J = estimated value; less than method detection limit.
CONC. FACTOR: indicates dilution of sample if greater than one (1). Minimum detection limits should be multiplied by conc. factor.

SAMPLE ID Reagent Blank 625 FRACTION 05A TEST CODE M625 A NAME Method 625 Acid Compounds
Date & Time Collected not specified Category

DATA FILE 5CB0258C05 DATE EXTRACTED 02/26/86 ANALYST WJL VERIFIED BY LAK
CONC. FACTOR 1 DATE INJECTED 03/10/86 INSTRUMENT 5100 COMPOUNDS DETECTED 0

NPDES	SCAN	EPA	COMPOUND	RESULT	NPDES	SCAN	EPA	COMPOUND	RESULT
11A		21A	2,4,6-trichlorophenol	ND	7A		58A	4-nitrophenol	ND
8A		22A	4-chloro-3-methylphenol	ND	5A		59A	2,4-dinitrophenol	ND
1A		24A	2-chlorophenol	ND	4A		60A	2-methyl-4,6-dinitrophenol	ND
2A		31A	2,4-dichlorophenol	ND	9A		64A	pentachlorophenol	ND
3A		34A	2,4-dimethylphenol	ND	10A		65A	phenol	ND
6A		57A	2-nitrophenol	ND					

SURROGATE RECOVERIES

SCAN	CODE	COMPOUND	RESULT
389	AS1	d5-phenol	80
285	AS2	2-fluorophenol	81
987	AS3	2,4,6-tribromophenol	120
	AS4	d3-phenol	

NOTES AND DEFINITIONS FOR THIS REPORT.
SCAN = scan number or retention time on chromatogram.
All results reported in ug/l unless otherwise specified.

SAMPLE ID Reagent Blank 625 FRACTION 05A TEST CODE M625 A NAME Method 625 Acid Compounds
Date & Time Collected not specified Category

ND = not detected at EPA detection limit method 625, (Federal Register, 11/26/84).
BL = detected in reagent blank; background subtraction not performed.
J = estimated value; less than method detection limit.
CONC. FACTOR: indicates dilution of sample if greater than one (1). Minimum detection limits should be multiplied by conc. factor.

CORPORATION

PAGE 35 Analytical Serv REPORT LAB # 86-02-158
RECEIVED: 02/25/86 Results by Sample

SAMPLE ID Reagent Blank 625 FRACTION 05A TEST CODE M625 B NAME Method 625 Base/Neutrals
Date & Time Collected not specified Category

DATA FILE SCB0258C05 DATE EXTRACTED 02/26/86 ANALYST WJL VERIFIED BY LAK
CONC. FACTOR 1 DATE INJECTED 03/10/86 INSTRUMENT 5100 COMPOUNDS DETECTED 1

NPDES	SCAN	EPA	COMPOUND	RESULT	NPDES	SCAN	EPA	COMPOUND	RESULT
1B		1B	acenaphthene	ND	41B		61B	N-nitrosodimethylamine	ND
4B		5B	benzidine	ND	43B		62B	N-nitrosodiphenylamine	ND
46B		8B	1,2,4-trichlorobenzene	ND	42B		63B	N-nitrosodi-n-propylamine	ND
33B		9B	hexachlorobenzene	ND	13B		66B	bis(2-ethylhexyl)phthalate	ND
36B		12B	hexachloroethane	ND	15B		67B	butyl benzyl phthalate	ND
11B		18B	bis(2-chloroethyl)ether	ND	26B	1194	68B	di-butyl phthalate	1
16B		20B	2-chloronaphthalene	ND	29B		69B	di-n-octyl phthalate	ND
20B		25B	1,2-dichlorobenzene	ND	24B		70B	diethyl phthalate	ND
21B		26B	1,3-dichlorobenzene	ND	25B		71B	dimethyl phthalate	ND
22B		27B	1,4-dichlorobenzene	ND	5B		72B	benzo(a)anthracene A	ND
23B		28B	3,3'dichlorobenzidine	ND	6B		73B	benzo(a)pyrene	ND
27B		35B	2,4-dinitrotoluene	ND	7B		74B	benzo(b)fluoranthene *	ND
28B		36B	2,6-dinitrotoluene	ND	9B		75B	benzo(k)fluoranthene *	ND
29B		37B	1,2-diphenylhydrazine	ND	18B		76B	chrysene A	ND
31B		39B	fluoranthene	ND	2B		77B	acenaphthylene	ND
17B		40B	4-chlorophenyl phenyl ether	ND	3B		78B	anthracene B	ND

SAMPLE ID Reagent Blank 625 FRACTION 05A TEST CODE M625 B NAME Method 625 Base/Neutrals
Date & Time Collected not specified Category

14B	41B	4-bromophenyl phenyl ether	ND	8B	79B	benzo(ghi)perylene	ND
12B	42B	bis(2-chloroisopropyl)ether	ND	32B	80B	fluorene	ND
10B	43B	bis(2-chloroethoxy)methane	ND	44B	81B	phenanthrene B	ND
34B	52B	hexachlorobutadiene	ND	19B	82B	dibenzo(a,h)anthracene	ND
35B	53B	hexachlorocyclopentadiene	ND	37B	83B	indeno(1,2,3-cd)pyrene	ND
38B	54B	isophorone	ND	45B	84B	pyrene	ND
39B	55B	naphthalene	ND				
40B	56B	nitrobenzene	ND				

SURROGATE RECOVERIES

SCAN	CODE	RESULT	
504	BS1	d5-nitrobenzene	43
766	BS2	2-fluorobiphenyl	51
1342	BS3	d14-terphenyl	23
	BS4	d10-biphenyl	

NOTES AND DEFINITIONS FOR THIS REPORT.

SCAN = scan number or retention time on chromatogram.
All results reported in ug/l unless otherwise specified.
ND = not detected at EPA detection limit method 625, (Federal Register, 10/26/84).
* = benzo(b)fluoranthene and benzo(k)fluoranthene co-elute.
A = benzo(a)anthracene and chrysene co-elute in high concentrations.

SAMPLE ID Reagent Blank 625 FRACTION 05A TEST CODE M625 B NAME Method 625 Base/Neutrals
Date & Time Collected not specified Category

B = anthracene and phenanthrene co-elute in high concentrations.
BL = detected in reagent blank; background subtraction not performed.
J = estimated value; less than method detection limit.
CONC. FACTOR: indicates dilution of sample if greater than one (1). Minimum detection limits should be multiplied by conc. factor.

CORPORATION

PAGE 1 Analytical Serv REPORT LAB # 86-02-171

RECEIVED: 02/26/86 03/20/86 12:11:33

REPORT TO: Radian
Bl. 4
Austin

ATTEN: Robert Wallace

CLIENT: LINCOLN SAMPLES: 3
COMPANY: Lincoln Properties
FACILITY:

PREPARED BY: Radian Analytical Services
8501 MoPac Blvd.
P.O. Box 9948
Austin, Texas 78766

ATTEN:
PHONE: (512) 454-4797

CERTIFIED BY

CONTACT: GRIMSHAW

WORK ID: 100 Congress Avenue
TAKEN: 2/25/86
TRANS: Fed Ex 736744452
TYPE: H20
P.O. #: 229-025-06-20
INV. #: 7531

Duplicate of report of 03/16/86.

Footnotes and Comments

* Indicates a value less than 5 times the detection limit. Potential error for such low values ranges between 50 and 100%.

@ Indicates that spike recovery for this analysis on the specific matrix was not within acceptable limits indicating an interferent present.

SAMPLE IDENTIFICATION

01 1-2ABN H20
02 E-3ABN H20
03 Reagent Blank H20 BNA

Analytical Serv TEST CODES and NAMES used on this report

EX 625 Extraction only - 625 BN/A
M625 A Method 625 Acid Compounds
M625 B Method 625 Base/Neutrals

TEST CODE default units	Sample 01 (entered units)	Sample 02 (entered units)	Sample 03 (entered units)
EX_625 date complete	02/27/86	02/27/86	02/27/86

RECEIVED: 02/26/86 Results by Sample

SAMPLE ID 1-2ABN H2O FRACTION 01A TEST CODE M625 A NAME Method 625 Acid Compounds
Date & Time Collected 02/25/86 Category

DATA FILE 5CU02171C01 DATE EXTRACTED 02/27/86 ANALYST M VERIFIED BY LAK
CONC. FACTOR 1 DATE INJECTED 03/12/86 INSTRUMENT 5100 COMPOUNDS DETECTED 0

NPDES	SCAN	EPA	COMPOUND	RESULT	NPDES	SCAN	EPA	COMPOUND	RESULT
11A		21A	2,4,6-trichlorophenol	ND	7A		58A	4-nitrophenol	ND
8A		22A	4-chloro-3-methylphenol	ND	5A		59A	2,4-dinitrophenol	ND
1A		24A	2-chlorophenol	ND	4A		60A	2-methyl-4,6-dinitrophenol	ND
2A		31A	2,4-dichlorophenol	ND	9A		64A	pentachlorophenol	ND
3A		34A	2,4-dimethylphenol	ND	10A		65A	phenol	ND
6A		57A	2-nitrophenol	ND					

SURROGATE RECOVERIES

SCAN	CODE	COMPOUND	RESULT
378	AS1	d5-phenol	26%
277	AS2	2-fluorophenol	14%
971	AS3	2,4,6-tribromophenol	22%
	AS4	d3-phenol	

NOTES AND DEFINITIONS FOR THIS REPORT.
SCAN = scan number or retention time on chromatogram.
All results reported in ug/l unless otherwise specified.

SAMPLE ID 1-2ABN H2O FRACTION 01A TEST CODE M625 A NAME Method 625 Acid Compounds
Date & Time Collected 02/25/86 Category

ND = not detected at EPA detection limit method 625, (Federal Register, 11/26/84).
BL = detected in reagent blank; background subtraction not performed.
J = estimated value; less than method detection limit.
CONC. FACTOR: indicates dilution of sample if greater than one (1). Minimum detection limits should be multiplied by conc. factor.

SAMPLE ID 1-2ABN H2O FRACTION 01A TEST CODE M625 B NAME Method 625 Base/Neutrals
Date & Time Collected 02/25/86 Category

DATA FILE 5CU02144C01 DATE EXTRACTED 02/27/86 ANALYST MM VERIFIED BY LAK
CONC. FACTOR 1 DATE INJECTED 03/12/86 INSTRUMENT 5100 COMPOUNDS DETECTED 1

NPDES	SCAN	EPA	COMPOUND	RESULT	NPDES	SCAN	EPA	COMPOUND	RESULT
1B		1B	acenaphthene	ND	41B		61B	N-nitrosodimethylamine	ND
4B		5B	benzidine	ND	43B		62B	N-nitrosodiphenylamine	ND
46B		8B	1,2,4-trichlorobenzene	ND	42B		63B	N-nitrosodi-n-propylamine	ND
33B		9B	hexachlorobenzene	ND	13B	1505	66B	bis(2-ethylhexyl)phthalate	1 J
36B		12B	hexachloroethane	ND	15B		67B	butyl benzyl phthalate	ND
11B		18B	bis(2-chloroethyl)ether	ND	26B		68B	di-butyl phthalate	ND
16B		20B	2-chloronaphthalene	ND	29B		69B	di-n-octyl phthalate	ND
20B		25B	1,2-dichlorobenzene	ND	24B		70B	diethyl phthalate	ND
21B		26B	1,3-dichlorobenzene	ND	25B		71B	dimethyl phthalate	ND
22B		27B	1,4-dichlorobenzene	ND	5B		72B	benzo(a)anthracene A	ND
23B		28B	3,3'dichlorobenzidine	ND	6B		73B	benzo(a)pyrene	ND
27B		35B	2,4-dinitrotoluene	ND	7B		74B	benzo(b)fluoranthene *	ND
28B		36B	2,6-dinitrotoluene	ND	9B		75B	benzo(k)fluoranthene *	ND
29B		37B	1,2-diphenylhydrazine	ND	18B		76B	chrysene A	ND
31B		39B	fluoranthene	ND	2B		77B	acenaphthylene	ND
17B		40B	4-chlorophenyl phenyl ether	ND	3B		78B	anthracene B	ND

SAMPLE ID 1-2ABN H2O FRACTION 01A TEST CODE M625 B NAME Method 625 Base/Neutrals
Date & Time Collected 02/25/86 Category

14B	41B	4-bromophenyl phenyl ether	ND	8B	79B	benzo(ghi)perylene	ND
12B	42B	bis(2-chloroisopropyl)ether	ND	32B	80B	fluorene	ND
10B	43B	bis(2-chloroethoxy)methane	ND	44B	81B	phenanthrene B	ND
34B	52B	hexachlorobutadiene	ND	19B	82B	dibenzo(a,h)anthracene	ND
35B	53B	hexachlorocyclopentadiene	ND	37B	83B	indeno(1,2,3-cd)pyrene	ND
38B	54B	isophorone	ND	45B	84B	pyrene	ND
39B	55B	naphthalene	ND				
40B	56B	nitrobenzene	ND				

SURROGATE RECOVERIES

SCAN	CODE	RESULT	
489	BS1	d5-nitrobenzene	86%
750	BS2	2-fluorobiphenyl	84%
1352	BS3	d14-terphenyl	92%
	BS4	d10-biphenyl	

NOTES AND DEFINITIONS FOR THIS REPORT.

SCAN = scan number or retention time on chromatogram.
All results reported in ug/l unless otherwise specified.
ND = not detected at EPA detection limit method 625, (Federal Register, 10/26/84).
* = benzo(b)fluoranthene and benzo(k)fluoranthene co-elute.
A = benzo(a)anthracene and chrysene co-elute in high concentrations.

SAMPLE ID 1-2ABN H2O FRACTION 01A TEST CODE M625 B NAME Method 625 Base/Neutrals
Date & Time Collected 02/25/86 Category

B = anthracene and phenanthrene co-elute in high concentrations.
BL = detected in reagent blank; background subtraction not performed.
J = estimated value; less than method detection limit.
CONC. FACTOR: indicates dilution of sample if greater than one (1). Minimum detection limits should be multiplied by conc. factor.

CORPORATION

PAGE 8 Analytical Serv REPORT LAB # 86-02-171
RECEIVED: 02/26/86 Results by Sample

SAMPLE ID E-3ABN H2O FRACTION 02A TEST CODE M625 A NAME Method 625 Acid Compounds
Date & Time Collected 02/25/86 Category

DATA FILE 5CU02171C02 DATE EXTRACTED 02/27/86 ANALYST MM VERIFIED BY LAK
CONC. FACTOR 1 DATE INJECTED 03/12/86 INSTRUMENT 5100 COMPOUNDS DETECTED 0

NPDES	SCAN	EPA	COMPOUND	RESULT	NPDES	SCAN	EPA	COMPOUND	RESULT
11A		21A	2,4,6-trichlorophenol	ND	7A		58A	4-nitrophenol	ND
8A		22A	4-chloro-3-methylphenol	ND	5A		59A	2,4-dinitrophenol	ND
1A		24A	2-chlorophenol	ND	4A		60A	2-methyl-4,6-dinitrophenol	ND
2A		31A	2,4-dichlorophenol	ND	9A		64A	pentachlorophenol	ND
3A		34A	2,4-dimethylphenol	ND	10A		65A	phenol	ND
6A		57A	2-nitrophenol	ND					

SURROGATE RECOVERIES

SCAN	CODE	COMPOUND	RESULT
375	AS1	d5-phenol	64%
270	AS2	2-fluorophenol	58%
970	AS3	2,4,6-tribromophenol	97%
	AS4	d3-phenol	

NOTES AND DEFINITIONS FOR THIS REPORT.
SCAN = scan number or retention time on chromatogram.
All results reported in ug/l unless otherwise specified.

SAMPLE ID E-3ABN H2O FRACTION 02A TEST CODE M625 A NAME Method 625 Acid Compounds
Date & Time Collected 02/25/86 Category

ND = not detected at EPA detection limit method 625, (Federal Register, 11/26/84).
BL = detected in reagent blank; background subtraction not performed.
J = estimated value; less than method detection limit.
CONC. FACTOR: indicates dilution of sample if greater than one (1). Minimum detection limits should be multiplied by conc. factor.

CORPORATION

PAGE 10 Analytical Serv REPORT LAB # 86-02-171
RECEIVED: 02/26/86 Results by Sample

SAMPLE ID E-3ABN H2O FRACTION 02A TEST CODE M625 B NAME Method 625 Base/Neutrals
Date & Time Collected 02/25/86 Category

DATA FILE 5CU02171C02 DATE EXTRACTED 02/27/86 ANALYST MM VERIFIED BY LAK
CONC. FACTOR 1 DATE INJECTED 03/12/86 INSTRUMENT 5100 COMPOUNDS DETECTED 1

NPDES	SCAN	EPA	COMPOUND	RESULT	NPDES	SCAN	EPA	COMPOUND	RESULT
1B		1B	acenaphthene	ND	41B		61B	N-nitrosodimethylamine	ND
4B		5B	benzidine	ND	43B		62B	N-nitrosodiphenylamine	ND
46B		8B	1,2,4-trichlorobenzene	ND	42B		63B	N-nitrosodi-n-propylamine	ND
33B		9B	hexachlorobenzene	ND	13B		66B	bis(2-ethylhexyl)phthalate	ND
36B		12B	hexachloroethane	ND	15B		67B	butyl benzyl phthalate	ND
11B		18B	bis(2-chloroethyl)ether	ND	26B	1178	68B	di-butyl phthalate	1 J
16B		20B	2-chloronaphthalene	ND	29B		69B	di-n-octyl phthalate	ND
20B		25B	1,2-dichlorobenzene	ND	24B		70B	diethyl phthalate	ND
21B		26B	1,3-dichlorobenzene	ND	25B		71B	dimethyl phthalate	ND
22B		27B	1,4-dichlorobenzene	ND	5B		72B	benzo(a)anthracene A	ND
23B		28B	3,3'dichlorobenzidine	ND	6B		73B	benzo(a)pyrene	ND
27B		35B	2,4-dinitrotoluene	ND	7B		74B	benzo(b)fluoranthene *	ND
28B		36B	2,6-dinitrotoluene	ND	9B		75B	benzo(k)fluoranthene *	ND
29B		37B	1,2-diphenylhydrazine	ND	18B		76B	chrysene A	ND
31B		39B	fluoranthene	ND	2B		77B	acenaphthylene	ND
17B		40B	4-chlorophenyl phenyl ether	ND	3B		78B	anthracene B	ND

SAMPLE ID E-3ABN H2O FRACTION 02A TEST CODE M625 B NAME Method 625 Base/Neutrals
Date & Time Collected 02/25/86 Category

14B	41B	4-bromophenyl phenyl ether	ND	8B	79B	benzo(ghi)perylene	ND
12B	42B	bis(2-chloroisopropyl)ether	ND	32B	80B	fluorene	ND
10B	43B	bis(2-chloroethoxy)methane	ND	44B	81B	phenanthrene B	ND
34B	52B	hexachlorobutadiene	ND	19B	82B	dibenzo(a,h)anthracene	ND
35B	53B	hexachlorocyclopentadiene	ND	37B	83B	indeno(1,2,3-cd)pyrene	ND
38B	54B	isophorone	ND	45B	84B	pyrene	ND
39B	55B	naphthalene	ND				
40B	56B	nitrobenzene	ND				

SURROGATE RECOVERIES

SCAN	CODE	RESULT	
488	BS1	d5-nitrobenzene	106
749	BS2	2-fluorobiphenyl	112
1325	BS3	d14-terphenyl	114
	BS4	d10-biphenyl	

NOTES AND DEFINITIONS FOR THIS REPORT.

SCAN = scan number or retention time on chromatogram.
All results reported in ug/l unless otherwise specified.
ND = not detected at EPA detection limit method 625, (Federal Register, 10/26/84).
* = benzo(b)fluoranthene and benzo(k)fluoranthene co-elute.
A = benzo(a)anthracene and chrysene co-elute in high concentrations.

SAMPLE ID E-3ABN H2O FRACTION 02A TEST CODE M625 B NAME Method 625 Base/Neutrals
Date & Time Collected 02/25/86 Category

B = anthracene and phenanthrene co-elute in high concentrations.
BL = detected in reagent blank; background subtraction not performed.
J = estimated value; less than method detection limit.
CONC. FACTOR: indicates dilution of sample if greater than one (1). Minimum detection limits should be multiplied by conc. factor.

SAMPLE ID Reagent Blank H20 BNA FRACTION 03A TEST CODE M625 A NAME Method 625 Acid Compounds
Date & Time Collected not specified Category

DATA FILE 5CU02171C03 DATE EXTRACTED 02/27/86 ANALYST MM VERIFIED BY LAK
CONC. FACTOR 1 DATE INJECTED 03/12/86 INSTRUMENT 5100 COMPOUNDS DETECTED 0

NPDES	SCAN	EPA	COMPOUND	RESULT	NPDES	SCAN	EPA	COMPOUND	RESULT
11A		21A	2,4,6-trichlorophenol	ND	7A		58A	4-nitrophenol	ND
8A		22A	4-chloro-3-methylphenol	ND	5A		59A	2,4-dinitrophenol	ND
1A		24A	2-chlorophenol	ND	4A		60A	2-methyl-4,6-dinitrophenol	ND
2A		31A	2,4-dichlorophenol	ND	9A		64A	pentachlorophenol	ND
3A		34A	2,4-dimethylphenol	ND	10A		65A	phenol	ND
6A		57A	2-nitrophenol	ND					

SURROGATE RECOVERIES

SCAN	CODE	COMPOUND	RESULT
375	AS1	d5-phenol	79%
272	AS2	2-fluorophenol	76%
969	AS3	2,4,6-tribromophenol	146%
	AS4	d3-phenol	

NOTES AND DEFINITIONS FOR THIS REPORT.
SCAN = scan number or retention time on chromatogram.
All results reported in ug/l unless otherwise specified.

SAMPLE ID Reagent Blank H2O BNA FRACTION 03A TEST CODE M625 A NAME Method 625 Acid Compounds
Date & Time Collected not specified Category

ND = not detected at EPA detection limit method 625, (Federal Register, 11/26/84).
BL = detected in reagent blank; background subtraction not performed.
J = estimated value; less than method detection limit.
CONC. FACTOR: indicates dilution of sample if greater than one (1). Minimum detection limits should be multiplied by conc. factor.

CORPORATION

PAGE 15 Analytical Serv REPORT LAB # 86-02-171
RECEIVED: 02/26/86 Results by Sample

SAMPLE ID Reagent Blank H2O BNA FRACTION 03A TEST CODE M625 B NAME Method 625 Base/Neutrals
Date & Time Collected not specified Category

DATA FILE 5CU02171C03 DATE EXTRACTED 02/27/86 ANALYST MM VERIFIED BY LAK
CONC. FACTOR 1 DATE INJECTED 03/12/86 INSTRUMENT 5100 COMPOUNDS DETECTED 0

NPDES	SCAN	EPA	COMPOUND	RESULT	NPDES	SCAN	EPA	COMPOUND	RESULT
1B		1B	acenaphthene	ND	41B		61B	N-nitrosodimethylamine	ND
4B		5B	benzidine	ND	43B		62B	N-nitrosodiphenylamine	ND
46B		8B	1,2,4-trichlorobenzene	ND	42B		63B	N-nitrosodi-n-propylamine	ND
33B		9B	hexachlorobenzene	ND	13B		66B	bis(2-ethylhexyl)phthalate	ND
36B		12B	hexachloroethane	ND	15B		67B	butyl benzyl phthalate	ND
11B		18B	bis(2-chloroethyl)ether	ND	26B		68B	di-butyl phthalate	ND
16B		20B	2-chloronaphthalene	ND	29B		69B	di-n-octyl phthalate	ND
20B		25B	1,2-dichlorobenzene	ND	24B		70B	diethyl phthalate	ND
21B		26B	1,3-dichlorobenzene	ND	25B		71B	dimethyl phthalate	ND
22B		27B	1,4-dichlorobenzene	ND	5B		72B	benzo(a)anthracene A	ND
23B		28B	3,3'dichlorobenzidine	ND	6B		73B	benzo(a)pyrene	ND
27B		35B	2,4-dinitrotoluene	ND	7B		74B	benzo(b)fluoranthene *	ND
28B		36B	2,6-dinitrotoluene	ND	9B		75B	benzo(k)fluoranthene *	ND
29B		37B	1,2-diphenylhydrazine	ND	18B		76B	chrysene A	ND
31B		39B	fluoranthene	ND	2B		77B	acenaphthylene	ND
17B		40B	4-chlorophenyl phenyl ether	ND	3B		78B	anthracene B	ND

SAMPLE ID Reagent Blank H2O BNA FRACTION 03A TEST CODE M625 B NAME Method 625 Base/Neutrals
Date & Time Collected not specified Category

14B	41B	4-bromophenyl phenyl ether	ND	8B	79B	benzo(ghi)perylene	ND
12B	42B	bis(2-chloroisopropyl)ether	ND	32B	80B	fluorene	ND
10B	43B	bis(2-chloroethoxy)methane	ND	44B	81B	phenanthrene B	ND
34B	52B	hexachlorobutadiene	ND	19B	82B	dibenzo(a,h)anthracene	ND
35B	53B	hexachlorocyclopentadiene	ND	37B	83B	indeno(1,2,3-cd)pyrene	ND
38B	54B	isophorone	ND	45B	84B	pyrene	ND
39B	55B	naphthalene	ND				
40B	56B	nitrobenzene	ND				

SURROGATE RECOVERIES

SCAN	CODE	RESULT	
488	BS1	d5-nitrobenzene	102
749	BS2	2-fluorobiphenyl	104
1324	BS3	d14-terphenyl	128
	BS4	d10-biphenyl	

NOTES AND DEFINITIONS FOR THIS REPORT.

SCAN = scan number or retention time on chromatogram.
All results reported in ug/l unless otherwise specified.
ND = not detected at EPA detection limit method 625, (Federal Register, 10/26/84).
* = benzo(b)fluoranthene and benzo(k)fluoranthene co-elute.
A = benzo(a)anthracene and chrysene co-elute in high concentrations.

SAMPLE ID Reagent Blank H20 BNA FRACTION 03A TEST CODE M625 B NAME Method 625 Base/Neutrals
Date & Time Collected not specified Category

B = anthracene and phenanthrene co-elute in high concentrations.
BL = detected in reagent blank; background subtraction not performed.
J = estimated value; less than method detection limit.
CONC. FACTOR: indicates dilution of sample if greater than one (1). Minimum detection limits should be multiplied by conc. factor.

CORPORATION

PAGE 1 Analytical Serv REPORT LAB # 86-02-155

RECEIVED: 02/25/86 03/21/86 11:30:15

REPORT TO: Radian
Bl. 4
Austin

ATTEN: Robert Wallace

CLIENT: LINCOLN SAMPLES: 6
COMPANY: Lincoln Properties
FACILITY:

WORK ID: 100 Congress Av.
TAKEN: WH, JM
TRANS: WH
TYPE:
P.O. #: 229-025-06-20
INVOICE: under separate cover

PREPARED BY: Radian Analytical Services
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**Sample showed interference.
BOD data received by phone from Aqualab.

Footnotes and Comments

* Indicates a value less than 5 times the detection limit. Potential error for such low values ranges between 50 and 100%.

@ Indicates that spike recovery for this analysis on the specific matrix was not within acceptable limits indicating an interferent present.

SAMPLE IDENTIFICATION

01	I1
02	E1
03	E2
04	B1
05	I2
06	E3

Analytical Serv TEST CODES and NAMES used on this report

AG E	Silver, ICPES
AS GA	Arsenic, low level
BA E	Barium, ICPES
BOD5	Biological Oxygen Demand
B E	Boron, ICPES
CD E	Cadmium, ICPES
CH2O	Formaldehyde
CL IC	Chloride IC
CNTOTA	Total Cyanide
COD A	Chemical Oxygen Demand
CR E	Chromium, ICPES
CU E	Copper, ICPES
DG3020	Digestion by Method 3020
DG6010	Digestion by Method 6010
HG CA	Mercury, Cold Vapor
MN E	Manganese, ICPES
NI E	Nickel, ICPES
PB GA	Lead, low level
PHEN A	Total Phenolics
PH A	pH
SETS A	Settleable Solids
SE GA	Selenium, low level
SO4 IC	Sulfate IC
TDS A	Total Dissolved Solids
TPO4 A	Total Phosphate
TSS A	Total Suspended Solids
ZN E	Zinc, ICPES

SAMPLE ID I1 SAMPLE # 01 FRACTIONS: A,B,C,D,E,F,G
Date & Time Collected 02/24/86 Category

AG_E	0.002* ug/ml	AS_GA	0.012* ug/ml	BA_E	0.18 ug/ml	BOD5	12 mg/L	B_E	0.28 ug/ml	CD_E	0.11 ug/ml
CH2O	0.25 mg/L	CL_IC	76 mg/L	CNTOTA	0.09 mg/L	COD_A	<5 mg/L	CR_E	0.022* ug/ml	CU_E	0.008 ug/ml
DG3020	03/06/86 date complete	DG6010	03/18/86 date complete	HG_CA	<.0002 ug/ml	MN_E	0.054 ug/ml	NI_E	0.025 ug/ml	PB_GA	0.002* ug/ml
PHEN_A	0.010* mg/L	PH_A	8.80 pH units	SETS_A	<1 ml/L	SE_GA	<.003 ug/ml	SO4_IC	240 mg/L	TDS_A	720 mg/L
TPO4_A	0.26 mg/L as P	TSS_A	17 mg/L	ZN_E	0.076 ug/ml						

SAMPLE ID E1 SAMPLE # 02 FRACTIONS: A,B,C,D,E,F,G
Date & Time Collected 02/24/86 Category

AG_E	<.002 ug/ml	AS_GA	0.10* ug/ml	BA_E	0.053 ug/ml	BOD5	3 mg/L	B_E	<.05 ug/ml	CD_E	<.002 ug/ml
CH2O	0.07 mg/L	CL_IC	71 mg/L	CNTOTA	0.01* mg/L	COD_A	<5 mg/L	CR_E	<.005 ug/ml	CU_E	<.001 ug/ml
DG3020	03/06/86 date complete	DG6010	03/18/86 date complete	HG_CA	0.0004* ug/ml	MN_E	0.022 ug/ml	NI_E	<.003 ug/ml	PB_GA	0.003* ug/ml
PHEN_A	0.20** mg/L	PH_A	8.83 pH units	SETS_A	<1 ml/L	SE_GA	<.003 ug/ml	SO4_IC	200 mg/L	TDS_A	680 mg/L

TPO4_A	0.20 mg/L as P	TSS_A	4* mg/L	ZN_E	0.012* ug/ml						

SAMPLE ID E2 SAMPLE # 03 FRACTIONS: A, B, C, D, E, F, G
Date & Time Collected 02/24/86 Category

AG_E	0.002* ug/ml	AS_GA	0.027 ug/ml	BA_E	0.055 ug/ml	BOD5	4 mg/L	B_E	<.05 ug/ml	CD_E	<.002 ug/ml
CH2O	0.09 mg/L	CL_IC	76 mg/L	CNTOTA	0.01* mg/L	COD_A	15 mg/L	CR_E	0.016* ug/ml	CU_E	0.004* ug/ml
DG3020	03/06/86 date complete	DG6010	03/18/86 date complete	HG_CA	<.0002 ug/ml	MN_E	0.024 ug/ml	NI_E	0.044 ug/ml	PB_GA	0.004* ug/ml
PHEN_A	0.008* mg/L	PH_A	8.71 pH units	SETS_A	<1 ml/L	SE_GA	<.003 ug/ml	SO4_IC	220 mg/L	TDS_A	590 mg/L
TPO4_A	0.13 mg/L as P	TSS_A	6 mg/L	ZN_E	0.010* ug/ml						

SAMPLE ID B1 SAMPLE # 04 FRACTIONS: A, B, C, D, E, F, G
Date & Time Collected 02/24/86 Category

AG_E	0.006* ug/ml	AS_GA	<.003 ug/ml	BA_E	0.001* ug/ml	BOD5	8 mg/L	B_E	<.05 ug/ml	CD_E	<.002 ug/ml
CH2O	0.15 mg/L	CL_IC	<1 mg/L	CNTOTA	<.01 mg/L	COD_A	15 mg/L	CR_E	<.005 ug/ml	CU_E	0.003* ug/ml

DG3020 03/06/86 date complete	DG6010 03/18/86 date complete	HG_CA <.0002 ug/ml	MN_E 0.021 ug/ml	NI_E <.003 ug/ml	PB_GA 0.002* ug/ml
PHEN_A <.005 mg/L	PH_A 8.82 pH units	SETS_A <1 ml/L	SE_GA <.003@ ug/ml	SO4_IC <1 mg/L	TDS_A <1 mg/L
TPO4_A <.02 mg/L as P	TSS_A 3* mg/L	ZN_E <.003 ug/ml			

SAMPLE ID I2 SAMPLE # 05 FRACTIONS: A,B,C,D,E,F,G
Date & Time Collected 02/25/86 Category

AG_E 0.004* ug/ml	AS_GA 0.008* ug/ml	BA_E 0.061 ug/ml	BOD5 9 mg/L	B_E 0.24* ug/ml	CD_E <.002 ug/ml
CH2O 0.42 mg/L	CL_IC 78 mg/L	CNTOTA 0.07 mg/L	COD_A 21 mg/L	CR_E 0.007* ug/ml	CU_E 0.009 ug/ml
DG3020 03/06/86 date complete	DG6010 03/18/86 date complete	HG_CA <.0002 ug/ml	MN_E 0.043 ug/ml	NI_E 0.009* ug/ml	PB_GA 0.008 ug/ml
PHEN_A 0.029 mg/L	PH_A 8.22 pH units	SETS_A <1 ml/L	SE_GA <.003 ug/ml	SO4_IC 250 mg/L	TDS_A 660 mg/L
TPO4_A 0.03* mg/L as P	TSS_A 38 mg/L	ZN_E 0.032 ug/ml			

SAMPLE ID E3 SAMPLE # 06 FRACTIONS: A, B, C, D, E, F, G
Date & Time Collected 02/25/86 Category

AG_E 0.005* ug/ml	AS_GA 0.010* ug/ml	BA_E 0.061 ug/ml	BOD5 7 mg/L	B_E <.05 ug/ml	CD_E <.002 ug/ml
CH2O 0.25 mg/L	CL_IC 80 mg/L	CNTOTA <.01 mg/L	COD_A 13 mg/L	CR_E 0.006* ug/ml	CU_E 0.002* ug/ml
DG3020 03/06/86 date complete	DG6010 03/18/86 date complete	HG_CA <.0002 ug/ml	MN_E 0.024 ug/ml	NI_E <.003 ug/ml	PB_GA 0.008 ug/ml
PHEN_A <.005 mg/L	PH_A 8.58 pH units	SETS_A <1 ml/L	SE_GA <.003 ug/ml	SO4_IC 240 mg/L	TDS_A 780 mg/L
TPO4_A 0.05* mg/L as P	TSS_A 12 mg/L	ZN_E 0.016 ug/ml			